Home Computing WEEKLY

NEW

An Argus Specialist Publication

March 15-21, 1983 No. 2 35p

HEALTH RISK OF MICRO SPACE GAMES

Space invader games put as much stress on the heart as driving through heavy traffic. And some players could be risking long-term heart trouble.

Volunteers, wired up with electrodes, have spent hours playing the game on a laboratory micro at Birmingham University.

Researchers have identified up to 25 young men with very high heart rate increases while playing. Now the families of all 100 volunteers are being checked to see if there is a history of cardiovascular problems.

The research is being led by psychologist Dr. Douglas Carroll with assistant Jane Sims.

They want to find out why stress affects some people and not others and whether heredity plays any part in cardiovascular complaints.

So far 100 students, aged 18-25, have played the game on a Commodore PET micro. Outsiders are now going through the same tests.

Dr Carroll said: "We are using one of the first generation of space invaders — it's not one of the more complex games that have come along since. We are finding in some individuals that they showed very high heart rate changes.

"Between a quarter and fifth had heart rate changes which were greater than we would expect.

"The game provides a competitive situation in which the player, particularly the inexpert, may find difficulty in coping. If someone who is susceptible would play a lot then it could have an effect on health."

He emphasised that his volunteers were healthy young men on whom the tests would have no effect.

He said: "We are simply using the game as a rather good way of inducing heart rate changes."

People with very high changes in heart rate stood a five times

Continued on page 3

Radio software gets go-ahead

Programs are going out by radio, now the Home Office has granted permission.

Presenters Tim Lyons and Edwin Tozer, both engineers at Bristol-based Radio West, had to get special consent to broadcast data during their Monday night Datarama programme.

Edwin, 26, who has a BBC model B micro at home, said: "We had to get permission from the IBA and the Home Office because the IBA were not sure we were allowed to do it under the broadcasting act.

"During the programme we are broadcasting data for the BBC micro and the ZX81 at the moment. I think it's going to take off in a big way — there's a lot of interest.

"We reckon there are about 15,000 computer owners in our broadcast area and we hope to put out data for the Commodore 64, the Dragon, Apple and the Spectrum.

"We will probably let the show regularise itself and then offer it to the network, about 40 stations."

Edwin and Tim, 31, suggest two methods of receiving the

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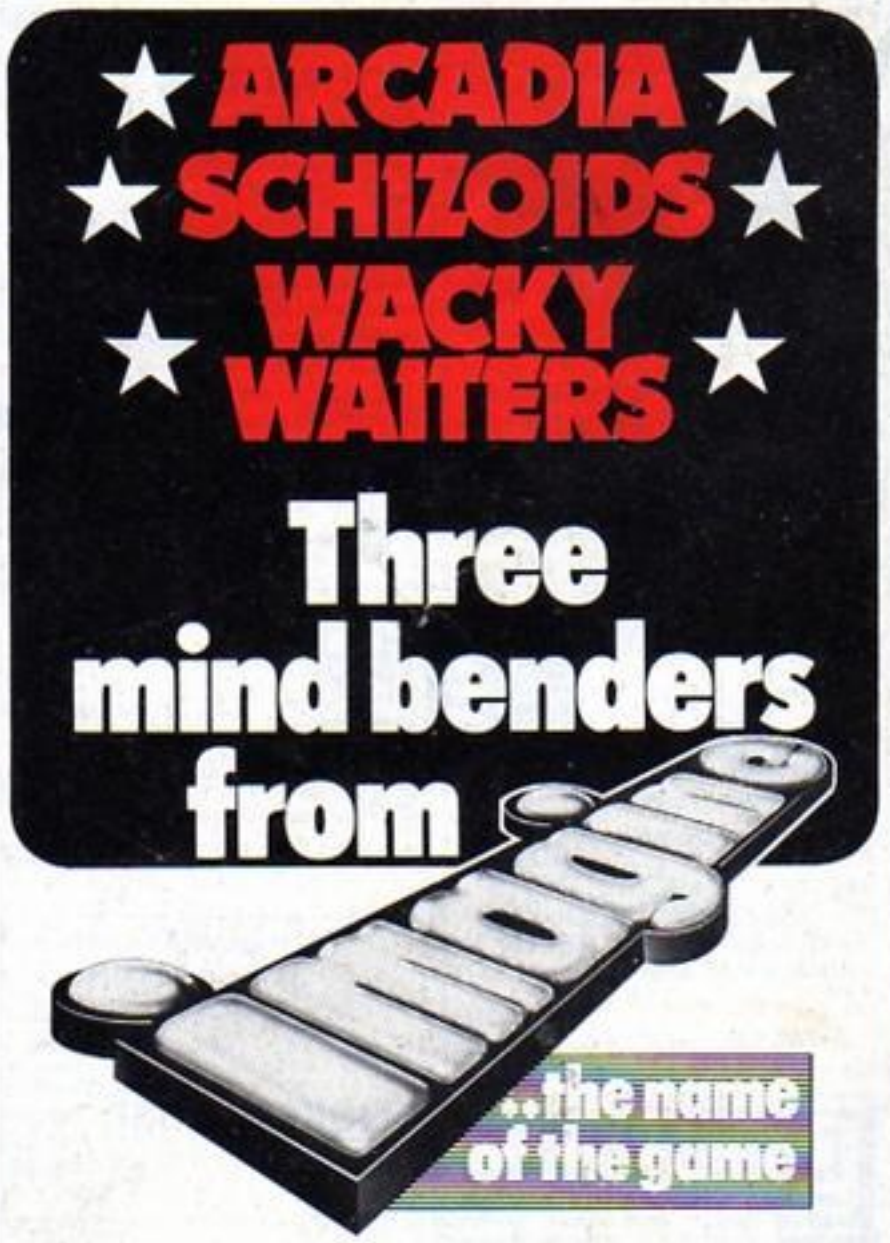
INSIDE

Reviews of software for VIC-20

Programs to type in for: Spectrum, VIC-20, BBC, Commodore 64, ZX81, Atom

Profile of software house

Articles on Atari, bulletin boards



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By Andrew Hewson

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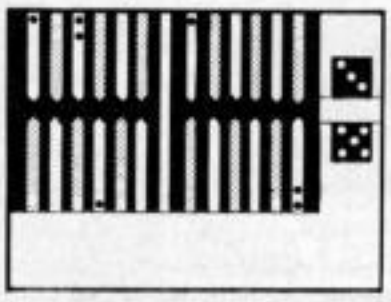

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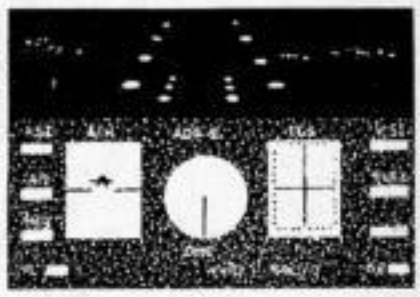

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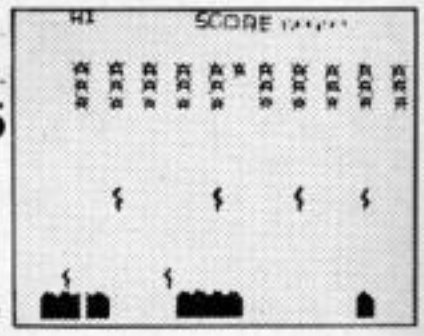

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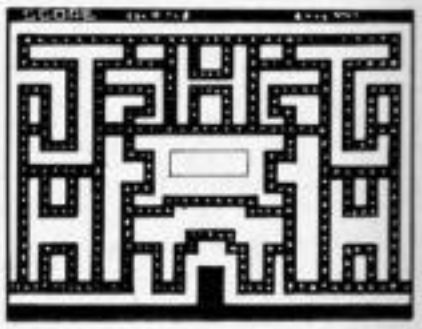

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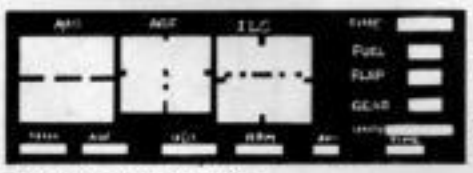

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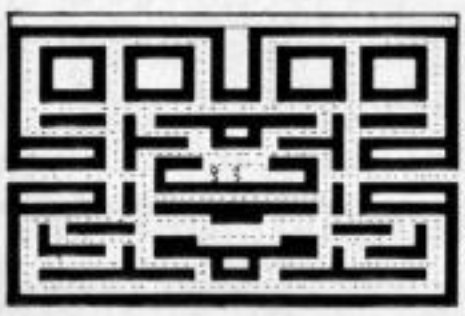
see "NIGHTFLITE". Essentially the same as "NIGHTFLITE" but without the Hi Res Graphics.



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News 5, 6, 8, 10, 13, 15
All the latest — new software, new micros

Tandy printer 16-17
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Spectrum program 43
An eye-catching fruit machine game. Just type it in and place your bets

IN BRIEF

Commercial TV stations and the BBC have been given consent to broadcast programs for direct downloading into micros.

The Telecommunications Bill has been amended by the Government in a Commons committee.

Junior industry minister John Butcher said telesoftware was permitted now, but only if it was capable of TV display too.

Direct downloading meant the signals went straight into computers without a visual display.

• • •

Oric-1 software is being produced by a new company, Kenema Associates.

Included in the range is a £15 Multipurpose/Personnel Records File which, says Kenema, allows mass storage and file handling of confidential information on personnel or products.

There is also an Oric-1 Keyboard Trainer, games, books and accessories, including American Oric-1 T-shirts.

Kenema Associates, 1 Marlborough Drive, Worle, Avon. BS22 0DQ

• • •

Screen glare getting you down? Regisbrook says it has come up with the answer — an aerosol spray for £8.95.

It dries to a scratch-resistant matt film which is said to cut reflected glare by up to 75 per cent while retaining 95 per cent of the brightness with only a negligible effect of clarity.

Regisbrook has also brought out Anit-Matter, an aerosol spray cleaner for similar surfaces. The two products can be bought together at £14.50.

Regisbrook, Studio House, 215 Kings Road, Reading, Berks RG1 4LS.

Editor: Ron Harris
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Advertisement Manager: Coleen Pimm
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Managing Director: Jim Connell

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Continued from Front Cover

greater chance, on average, of later suffering from hearts problems.

Dr Carroll said: "We are using space invaders to imitate what may be happening in other stressful situations."

Volunteers wore electrodes to measure their heart rates and masks to measure their respiration. Away from the laboratory the electrodes were connected to tiny tape recorders to record heart rates in their day-to-day lives.

Normal heart beat is 70 per minute. While playing space invaders it went up to 90-100.

Describing the body's reaction to the game, Mrs Sims said: "It's like driving a car on busy roads or doing some hard study. This has to be put against any other risk factor like diet or smoking.

"The fact of the matter is that it was not necessarily those who were addicted to the game who had a high heart rate.

"None of them seemed to mind doing it. The people we were testing have been involved in other projects, so this is nothing unusual for them.

"They all seemed to have been happy playing the game. I don't play very much myself — I don't find the time."

The study, financed by the Medical Research Council, is a pilot project due to end in November.

Artic Computing boss Richard Turner smiled when he heard of the study and said: "Does this mean we'll have to put a Government health warning on our cassettes."

He said: "The people who play our games are usually teenagers. Your average overweight 50-year-old doesn't play space invader-type games.

"It might be a strain on the heart, but they can take it.

And Mark Butler, partner in Liverpool software house Imagine, said: "We design an arcade game so that people's heart rates do increase. My heart beats faster when I'm playing football — and that's good for you."

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ZX SPECTRUM input/output port. The kit £11.95. Built £15.95. Plugs onto the back of the spectrum doesn't require motherboard. (uses *BASIC* in and out commands).

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NEW Masterfile-16 for 16K Spectrum owners. We have produced a subset version of MASTERFILE called MASTERFILE-16. It has most of the features of big MASTERFILE, with 7 pre-defined report formats and 6 pre-defined fields e.g. name, address, etc., and we have found a useful 4500 bytes of file space. MASTERFILE and MASTERFILE-16 are fully 'file-compatible' and will happily process each other's files, so that 16K owners who upgrade to 48K can use their old files immediately. Complete with 12-page manual, priced at £8.95

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HCW 2

Continued from Front Cover

data. The most reliable is to tape it onto a cassette recorder/radio. This means the volume can be adjusted when the program is loaded into the computer. A second method is to connect the radio directly to the computer.

In this way listeners can see the program on screen as it is being discussed in the studio.

Longer programs, starting with the Newbrain and the Epson HX-20, will be broadcast after the station's 1am closedown to 5.45am.

Radio stations are obliged to broadcast a steady tone during non-programme hours. Every 15 minutes a tape recorder in Radio West's studio automatically sends out an identification message. The data is simply being added to this.

Edwin, who broadcasts as Zorte, said: "Micro enthusiasts are well known for burning the midnight oil."

Tim and Edwin believe it is the first time in Britain that radio has been regularly used to transmit programs.

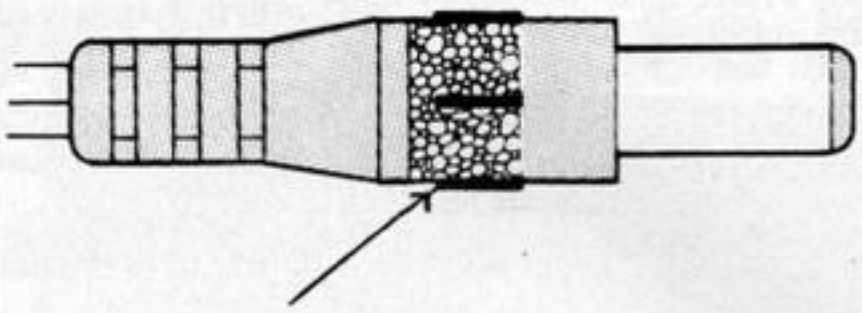
Why does Edwin use the name Zorte? He explained: "When I first arrived here I was in motorcycle gear and they thought I looked like an alien, so they called me Zorte from the planet Oje — an anagram of Joe Tozer. Some people call me Joe."

Radio West broadcasts on 238m (1260KHz) medium wave and 96.3 VHF. According to Edwin, its medium wave signal, transmitted from Mangotsfield, north of Bristol, can be received in a 40-mile radius, and the FM signal, which comes from Daudney Hill, south of Bristol, covers a 25-mile radius.

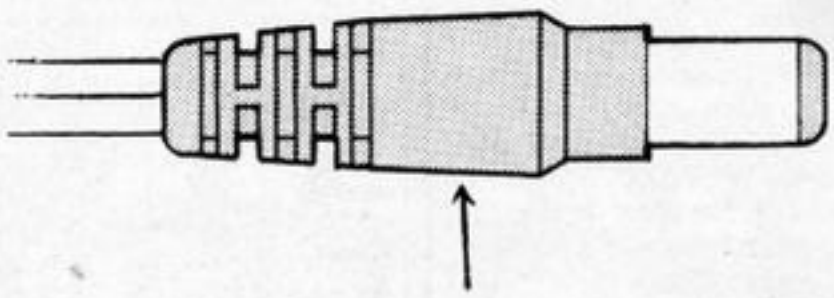
Strangely, they have found data reception is more reliable on medium wave. Datarama goes out on Monday nights at 7.30-8pm.

BBC Television's series Making the Most of the Micro also transmitted a program last night. It will be broadcast again when the programme is repeated on Sunday at 12.35pm.

Radio West, P.O. Box 963, Watershed, Canon's Road, Bristol BS99 7SN. Send a stamped addressed envelope.



Type A jack plug — perfectly safe grip



Type B jack plug — potentially dangerous surface with no grip

Big response to call-back

Sinclair's appeal for faulty Spectrum power supplies to be returned has brought a massive response.

"Our production director is confident he will get them all back," said a spokesman for Sinclair Research. "Keeping our fingers crossed, there doesn't seem to have been any accidents."

The appeal went out after a batch of 28,000 power supplies sold with Spectrums and made by sub-contractors were found to have faulty cables which, under some circumstances, could be dangerous."

Half were returned from stocks held by retailers and Sinclair and a personal letter from Clive Sinclair went to mail order customers.

A spokesman said: "They seem to be coming back fast — people are responding very quickly. They are getting their replacements in seven to 10 days.

"The only problem we are having is that the special address we have given is for returned power supplies only, not for other mail."

The problem is only with Spectrums bought between January 1 and up to three weeks ago and only if the lead between the power supply and the computer is black with a white stripe.

And it only affects power supplies with a smooth-surfaced — not textured — finger-grip on the jack plug.

Sinclair says anyone in any doubt about the type of jack plug should return their power supply.

The address: Sinclair Research Ltd, Unit F, Broad Lane, Cottenham, Cambridgeshire, CB4 4SW.

Magazines up and down

Latest official sales figures for monthly computer magazines show that two have lost readers and two have chalked up gains.

Computing Today, at 53,138, is up by 3,088 and Personal Computer World (85,105) has gained 18,563 sales.

The two which have lost circulation are Practical Computing (49,052), which is down by 11,720, and Your Computer (72,875), 11,375 less.

The most recent figures, checked by the Audit Bureau of Circulations, are for the six months to December and are compared with the same six months in 1981.

Your Computer's sales figure is compared with its first ABC rating, for the six months to June 1982. Its rival, Personal Computing Today, has a first ABC figure of 62,064.

Computing Today and Personal Computing Today are owned by the publishers of Home Computing Weekly, Argus Specialist Publications.

Software by post

London software stockists The Video Palace has started a mail order operation with the first of its quarterly catalogues.

Managing director Peter Stone said he was responding to postal enquiries and was aiming to give a service to people living out of town who had difficulty buying the latest goods.

It features software, books and add-ons for the Atari 400 and 800, TI-99/4A, BBC micro, Spectrum, VIC-20 and Commodore 64, along with advice and recommendations and a 10 per cent discount voucher.

The Video Palace, 62-64 Kensington High Street, London. W8

Top Ten programs for the Spectrum

1	The Hobbit	Sinclair
2	Flight Simulation	Sinclair
3	VU-3D	Sinclair
4	Time Gate	Quicksilva
5	Penetrator	Melbourne House
6	Hungry Horace	Sinclair
7	Chess	Sinclair
8	Avenger	Abacus
9	3-D Tanx	D K Tronics
10	Escape	New Generation

Compiled by W. H. Smith

Four years ago

Among the first computers from the Far East was the EG-2001 Video Genie, produced for an American customer, which came with 4K of ROM and a cartridge slot . . . a letter editor, written by ICL for the Nascom-1, came on two EPROMs and cost £70, plus eight per cent VAT . . . Commodore's PET, with screen and built-in cassette player, cost £643.52 and included 8K of RAM.

Atari chief to go it alone

In a surprise move, Atari chief Graham Daubney has quit the company to go into software sales.

He has bought into Birmingham-based Centresoft, run for nine months by Jeff Brown, and one of his first jobs is to open a London office.

Mr Daubney, married with a year-old daughter, said: "I'm now out in the big wide world. It was something I wanted to do in about two years, but this was an opportunity.

"I've known Jeff and his wife Anne for quite a while and we got together and worked out a deal. We got down to the nitty-gritty when I got back from the States in late January.

"Myself and Atari have parted on good terms. I was very sad to leave, but it was an opportunity I couldn't miss. My wife Jan is all in favour, too."

He said Centresoft at present had a catalogue of 100 titles on cassette, disco, ROMs and cartridges. The company — which specialises in Atari software — imports from America and distributes to the UK and Europe.

Mr Daubney, 28, said Centresoft's aim was to act as a filter, weeding out "the rubbish" to supply retailers only with good quality products. He planned to expand Centresoft's range.

Mr Daubney, who was one of four to set up Atari's UK computer operation in April last year, resigned as product manager of the home computer division. He said he had also been asked to be European editor of an Atari magazine, due in the UK in three months.

Centresoft, 26 Great Cornbow, Halesowen, West Midlands

Dads fuel micro boom

One home in every 20 has a microcomputer — and a quarter of them were sold in December, says a new survey.

Main buyers are father with school-age children. And once the micro is at home the main users, at 80 per cent, are father and son. Wife and daughter add up to just 11 per cent of the users.

The under-18s make up 45 per cent of users and the 20-50 age group accounts for another 49 per cent. The over-50s and those aged 18-20 seem to have little interest.

The survey, by Gowling Marketing Services for the trade fortnightly Microscope, was carried out in January and late February and included 2,000 UK households.

It also showed that one-third of home computers were bought in chain stores and 19 per cent by mail order.

Arcade games were the best-sellers with games and education totalling two-thirds of software sales. Domestic uses added up to only six per cent.

model	%
ZX81	43.3
Spectrum	14.4
VIC20	12.4
BBC Micro	5.2
Dragon	5.2
Sharp MZ80K	3.1

Market shares of leading machines

outlet	%
Mail order	19
Wh Smiths	18
Specialist shop	16
Spectrum	5
Dixons	5
Other High St shop	4
Boots	3
Currys MicroC	2
Lasky's	1
Other	24
Don't know	5

Where computers were bought

use	%
Arcade games	43
Educational	26
Business	13
Graphics	11
Home economics	6
Assembler	3
Other/don't know	34

What the machines are used for

Let us know

If you are in the microcomputer business, please let us have your news and products to review. Contact Paul Liptrot, Home Computing Weekly, 145 Charing Cross Road, London WC2H OEE. Phone: 01-437 1002.

Commodore attacks on home front

Commodore says it is now No. 1 in sales of home and personal computers — quite an announcement from a company, which, in my opinion, was a non-starter here a year ago. And Commodore predicts it will also be No. 1 in business computers too by this time next year.

Its new Commodore 64, reported to be selling at the rate of 30,000 a month, has been re-classified by the company from a personal to a home computer, which must mean, by its definition, a drop in price to below 500 dollars.

There has, in fact, been a flock of announcements from Commodore.

It's new portable, weighing just 12 lbs, has a built-in 5in screen, half-size dual 5¼in floppy discs, 64K of RAM, a combination of Z80 and 6510 processor chips and costs 1,000 dollars for the monochrome version. Then there's a speech synthesizer for the 64. It uses the SAY statement in a similar way to PRINT — you enclose whatever is to be "spoken" in quotation marks.

Commodore also announced its Model 128 which, not surprisingly, has 128K of RAM and a price of 795 dollars. There's the hand-held HHC-4, too, which can be hooked up to a regular TV screen, although it comes with a built-in liquid crystal display, and a video output to drive a monitor.

In the games department, Commodore talked about its Digi-Drum peripheral that can be connected to either the 64 or the VIC-20. This neat toy is a three-pad miniature drum set that allows the user to simulate the sounds of a snare drum, bass drum and high hat when connected to a stereo system. It's expected to cost about the same as a game cartridge.

★★★★★★★★★★★★

If you have a Sinclair 1000 (ZX81 to you) and are wondering what else you can do with it, wonder no longer. The Watchmaker's Guidebook to the Timex/Sinclair Computers is available by mail order from TSG Enterprises.

It lists about 120 software suppliers and 50 hardware manufacturers and other useful information such as user groups, books and articles which may be helpful.

A chapter offers help on writing BASIC programs. Written by peter Beck, the plan is to update the book quarterly.

Send 3.95 dollars (an international money order is best) plus shipping and handling charge to TSG Enterprises, Guidebook, 54 Richwood Place, Denville, New Jersey 07834. Shipping and handling is a dollar in the U.S. Add more for the UK, or ask TSG.

★★★★★★★★★★★★

It's important to have a sense of humour in this business. The first rock 'n' roll video game has been brought out by Data Age, of Campbell, California.

Available only for the Atari 2600 video game player, it's called Journey Escape and stars the rock band Journey. It's basically your fundamental day in the life of a rock star game. In order to win you have to get your group past hordes of groupies and assorted other "drawbacks" of life in the R & R fast lane.

Only in California...

Bud Izen
Fairfield, California

A colourful way to raise money

An eye-catching fruit machine game for the Spectrum, written by Clyde Bish

My fruit machine program has proved itself a good money-raiser for charity at fêtes.

Writen for the Spectrum, it makes eye-catching use of the colour and graphics facilities.

Line 530 is particularly interesting as it uses the SCREEN$ function in a way not mentioned in the handbook to simulate the DF CC variable of the ZX81.

The program as listed gives a profit of about 1p per roll.

This can be increased or decreased by altering either the payout for a win in lines 620, 655 and 740 or by changing the odds of RND in line 480.

```
100 INK 4: PRINT AT 7,12;"
"
110 PRINT AT 8,12;"
115 PRINT AT 8,14; INK 0;"3";AT
8,16;"7";AT 8,18;"4"
120 PRINT AT 9,12,"
"
130 PRINT AT 11,13; INK 2;"5p A
GO"

140 PRINT AT 13,2;"TWO PAYS 10p
....THREE PAYS 15p";AT 15,13; IN
K 1; FLASH 1;"JACKPOT";AT 16,10;
FLASH 0; INK 2;"777 PAYS 50p"
150 PRINT AT 19,9; INK 3;"PRESS
R TO ROLL"

200 FOR i=1 TO 6
210 INK i
220 PRINT AT 0,3;"
"
240 PRINT AT 1,3;"
"
260 PRINT AT 2,3;"
"
280 PRINT AT 3,3;"
"
300 PRINT AT 4,3;"
"
310 PAUSE 10
320 IF INKEY$<>"" THEN GO TO 40
0

330 NEXT i
340 GO TO 200
400 INK 0: PRINT AT 19,8;"
"

470 FOR j=1 TO 30
475 FOR f=1 TO 3
480 PRINT AT 8,12+2*f; INT (RND*
7)+1

485 NEXT f
490 NEXT j
530 LET a$=SCREEN$ (8,14): LET
b$=SCREEN$ (8,16): LET c$=SCREEN
$ (8,18)

531 IF a$<>b$ AND b$<>c$ AND a$
<>c$ THEN GO TO 6000
532 LET d=17

535 GO SUB 5400
565 FOR i=1 TO 3
570 PRINT TAB 3; FLASH 1; PAPER
4; INK 2;"WIN
  WIN"

575 PAUSE 2
580 NEXT i
585 LET d=21
590 GO SUB 5400
610 IF a$=b$ AND a$=c$ THEN GO
TO 650
620 PRINT AT 19,11;"PAY OUT 10p
"

630 PAUSE 100
640 GO TO 6015
650 IF a$="7" THEN GO TO 700
655 PRINT AT 19,11;"PAY OUT 15p
"

660 GO TO 630
700 FOR i=1 TO 70
710 PRINT AT 19,13;"JACKPOT"
720 PRINT AT 19,13;"
"
730 NEXT i
740 PRINT AT 19,11;"PAY OUT 50p
"

750 GO TO 630
5400 FOR i=3 TO 25 STEP 4
5500 PRINT AT d,i; FLASH 1; PAPE
R 4; INK 2;"WIN "
5550 PAUSE 2
5600 NEXT i
5620 PAUSE 2
5630 PRINT AT d,27; FLASH 1; PAP
ER 4; INK 2;"WIN"
5850 RETURN
6000 PRINT AT 19,5;"HARD LUCK!
 TRY AGAIN?"

6010 PAUSE 100
6015 FOR i=17 TO 21
6020 PRINT AT i,3;"
"

6022 NEXT i
6025 PRINT AT 19,9; INK 3;"PRESS
 R TO ROLL"
6030 GO TO 200
```

Bug-Byte stops mail-order sales

Liverpool-based Bug-Byte, with claimed sales of 30,000 software cassettes a month, has halted its mail order operation — and has six new releases out soon.

And Tony Baden revealed that he and partner Tony Milner, 24, are linking up with two others to open a tape duplicating plant.

Mr Baden, 23, said: "It will be completely independent."

Explaining the ending of mail order, he said that over the last six months demand for orders by post had fell by 50 percent, yet dealer sales were up by 300 percent."

The limiting factor was the rate at which cassettes could be copied — one duplicating company wanted eight weeks but Bug-Byte needed a two-week turn-round. This led to the decision to open their own plant.

Bug-Byte began three years ago with five 1K programs for the ZX80 priced at £2 and a £3 classified advert in a magazine.

Now, said Mr Baden, the partnership sold 30,000 cassettes a month from a catalogue of about 40 titles, had 220 dealers taking its products — with more coming in — and is moving to new premises in central Liverpool in May. Turnover was £⅓m rising to £1m-plus in the next financial year.

The new releases, priced at £7.50 to £9.50, are Space Invaders, Galaxy Wars, City Defence and a music synthesizer, all for the BBC micro, and an adventure game, The Castle, for the Oric-1 and the Spectrum. The first four are due out in a fortnight with the adventure game due two weeks later.

Tony Baden said Bug-Byte had 10 regular freelance programmers who each earned 10 percent of the wholesale price, or a lump sum of around £2,000-£3,000.

He said: "The difficulty is finding the good programmers. We don't want the average — we are continually improving our standards. Good programming is due to self-motivation, I don't think it's down to education.

"We get a lot of good programs sent in for the BBC machine but not for the Spectrum. It seems people who are good at programming buy the BBC micro."

Bug-Byte Software, Freepost, Liverpool L3 3AB

Smiths open micro stores

Computer shops-within-stores are being opened by W. H. Smith. And it has ordered Oric-1s and Commodore 64s to add to its Sinclair micros.

Merchandise controller Stewart Binnie said three stores — one large, one medium and one small — had been chosen for pilot computer shops before more were opened.

At present, W. H. Smith sells 5,000 Spectrums a week. Commodore 64s and 48K Oric-1s, plus BBC micro software, are planned to go on sale next month.

Mr Binnie said: "We don't take machines unless the software is available. We are now in the happy situation where the major software houses start writing programs when they know we are going to stock the machine."

Altogether £5m-£10m was being spent on the computer side of the business this year, most of it on computers.

The shops-within-stores would be a distinctive area, something like the wool shops in some W. H. Smith branches, and staffed by people trained at the company's Didcot college.

Mr Binnie is one of four W. H. Smith merchandise controllers, each of them responsible for a segment of the stores' product range.

He said: "We have had problems over the stock of some of the leading software titles.

"The problem is the duplicating capacity in the UK. Our orders were using most of it and still leaving us out of stock.

"Our sales are in the hundreds of thousands."

He said: "It's the fastest-growing area of our business, a phenomenon all of its own. How will it endure? It will continue to grow for a long time.

"There will be two years of the present growth, the figures are quite extraordinary. There are projections of 1½m computer sales."

He did not believe that rate would be sustained after two years.

W. H. Smith, 10 New Fetter Lane, London EC4

Get out of the cupboard, micro snobs

Why do the computer snobs knock poor old Uncle Clive? Having just announced that his company has successfully sold its one millionth computer, surely they must accept him by now?

After much experience along the long and winding road of hobby electronics, in which Clive Sinclair had brief forays into hi-fi, writing books, the infamous "black watch" and the low-cost calculator, he emerged triumphant on the computer scene in 1980 with the ZX80. With sceptical questions like "how can anyone produce a personal computer for under £100?", Clive Sinclair was relegated to the position of an inexperienced entrepreneur in a very grown-up and sophisticated market dominated by PETs, Apples and Tandys.

No-one would disagree that the ZX80 was very much to test the lower end of the computer market — but that argument could hardly be levelled at the ZX81. Realising the successful trail blazed with the ZX80, Sinclair Research was quick to introduce the '81. The price was an obvious winner, but it had other finer qualities, too.

Of course it had its bad points — the cassette LOAD and SAVE left a lot to be desired, the keyboard was difficult to wrap your fingers round and the reduced component count made the machine unnecessarily complex. But it sold. And, more importantly, it sold to the generations, old and young, that had yet to be "threatened" by computing. It made the inaccessible accessible to anyone who had under £100.

I wouldn't say Clive Sinclair has been original. In some ways, he has followed the classic marketing approach of Apple, building a machine with standard specifications and leaving it to others to fill in the rest, like joysticks, software, and soon, unlike Commodore, Tandy and Sharp who are somewhat exclusive about what gets added onto their machines) Sinclair Research has carved itself an impressive niche.

With the ZX Spectrum, the first whisperings of praise were heard in the more "serious" computer magazines. Hard bitten editors could be seen climbing out of the computer snobbery closet with back-handed compliments such as "mmm, it's a moderately fast machine" and "it's quite easy to produce user defined graphics on it but . . . ". You could tell — they quite liked it, and that was going to take some getting used to.

So, could it be that Clive has ousted all the computer snobs from their closets? Well, maybe not with the Spectrum, but I suppose that the "ZX83" might just cut the ice (and no, I don't know anything more than its development name). Take a look at all the fresh faces in the "under £100" computer market, and you'll see "Clive Sinclair" stamped on them — which, when you consider what Clive has done for the personal micro, might not be such a bad thing.

And what do I think of the Sinclair range of computers? Well, I climbed out of the computer snobbery cupboard a long time ago. Anyone who can induce computer programming hysteria in a nation of kids (from seven years old to 70) must be either a very lucky man or a genius.

If I ever find out which, you'll be the first to know.

Roger Munford
Deputy Editor, ZX Computing

● What makes you angry — delighted — about the micro market, hardware or software? We welcome contributions for this weekly column. Send them to: Opinion, Home Computing Weekly, 145 Charing Cross Road, London WC2H 0EE. Please include your occupation and your interest in computing.

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HCW 2

From left: Peter, Ian and Mark

Firefly cycles to success

Three sixth-formers wrote Spectrum programs in their bedrooms — and ended up with £170 profit. And now they are signing a marketing deal expected to earn them much more.

Firefly Software is a partnership of Ian Macey, 17, and 16-year-olds Mark Harman and Peter Aked, who live within cycling distance of each other in Berkshire.

The idea came to them after they had seen commercially written programs. Ian, whose father works for the Meteorological Office in Bracknell, said: "We were sure we could do better."

Ian raised the money he needed with part-time work creosoteing a fence and Peter was a spare-time labourer. They began work, learning machine code from books, last summer. Mark, who bought his 16K Spectrum from a school friend, joined them at Christmas.

Transport for this bedroom industry was bicycles — they cycled to each others' homes with Spectrums hanging from the handlebars.

All three are each studying for A-levels in the sixth form of a Wokingham comprehensive school. Ian said: "Our parents thought we were doing too much, but we think we can get by. They were a bit stunned when we earned so much money. We thought we might get enough to buy a printer."

Peter, whose father is an electronics engineer, said: "On the Friday before the ZX Microfair I was up until 1am taping my program onto cassettes I bought from W.H. Smith for 50p each."

The three hope they will make enough money to allow them to take a year off between school and further education to establish Firefly as a professional concern.

The Microfair was the first time their programs had been on sale — two games, Androids and Sword Fight at £4.95, and a collection of educational programs on one tape, priced at £3. All run on the 16K Spectrum.

They took £227.90 and made £170 profit after deducting the hire of their show table, £40.20, and other expenses.

And they reckon they could have sold even more — if they had more to sell and if they had been able to take a colour TV to the show. The only television they had on their table was black and white, so they put up a large sign saying the programs really were in colour.

In all they had 16 offers from shops, which wanted to buy batches of 20 to 30, and from distributors. They included a Dane, a South African, a Belgian — and a Spaniard who tried to negotiate through an interpreter.

Mark said: "I'm coming to terms with the fact that we may be going somewhere, but I'm trying not to build up our hopes.

"Our teachers are starting to be more sympathetic about late homework now. Our physics teachers have got Spectrums so we gave them copies of the programs."

Firefly Software, Sunnybank, Heath Ride, Wokingham, Berks RG11 3QN

Youngsters' programs

A new company, Schoolsoft, has been formed with the aim of producing software for infant and junior schoolchildren to run on the BBC model B micro.

The first eight programs, costing £5-£10, cover arithmetic, British Isles geography, handwriting and colour sequences.

Schoolsoft, 19 Shadwell Grove, Radcliffe-on-Trent, Nottingham.

Words for the Epson

Kuma Computers has brought out a word processor designed for the tiny printer built into Epson's HX-20 small computer.

It is called Desk-Master 2 and comes on the micro-cassettes used by the HX-20 and priced at £32.74. Kuma says it is easy to use and can also print larger documents on a full-size external printer.

Kuma Computers, 11 York Road, Maidenhead, Berks SL6 1SQ.

Shelve your micro

Home computer stand in the lower shelf slides away

Keep your micro tidy, say the people at Zygon Products who have produced this specially designed stand for use at home.

Costing £65.50, it is made from square steel tubing finished in black with shelves in silver-grey or teak laminate and is mounted on castors.

The lower shelf, measuring 26 inches by 19 inches, slides away when not in use. The upper shelf measures 28 inches by 19 inches.

The company says that the stand, provided with cable ties, has been designed to suit most home computers. Soon the basic stand will be extendable to take additional units.

Zygon Products, 9 Sheredes Drive, Broxbourne, Herts EN11 8LH.

missile panic

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NAVAL ATTACK — **ONLY £5**
With stunning Graphic display of mountains, golden beaches and deep blue seas, you are assigned to attack a vehicle convoy. Your on board gun has a quite unique sight which allows you to destroy your target with incredible precision. A totally addictive game that will leave you trembling with excitement.

SPACE WARS/BATTLE ZONE — **ONLY £5**
Two very exciting, hi-resolution, fast action, two player games that can be played simultaneously; for the price of one. Space wars (like the arcade game) is a typical dog fight. In Battle Zone, a cool, tactical head is needed to outwit your opponent.

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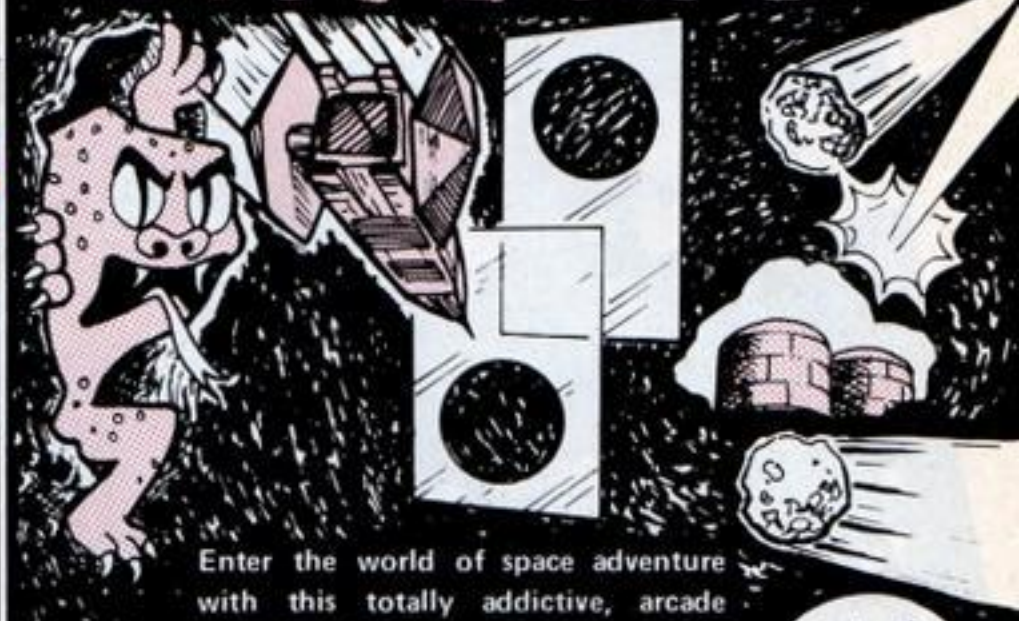

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It's week No.2 in our great £6,200 competition. Will you be one of our 115 winners?

We are giving away 15 computers and £2,500-worth of software in Home Computing Weekly's free, easy to enter competition. It is spread out over our first three issues, so you'll need the coupon from last week and next week's issues too.

We have got together with leading software house Quicksilva and Sinclair Research, makers of the best-selling micros.

These are the prizes:

★ Fifteen 48K ZX Spectrums, each with a printer and three programs from Sinclair's range. Each of these prize packages is worth £250.

★ Software worth £2,500 from Quicksilva. Make your choice from a range of 39 programs for the Spectrum, VIC-20, ZX81, BBC, Dragon and Atari. This total is divided into 100 vouchers of £25 each.

All you have to do is to answer the questions in the coupon. All of the questions are based on this week's issue of Home Computing Weekly. Keep the coupon, with last week's, in a safe place.

There will be a final set of questions next week along with details of how to send in all three coupons.

Do not send anything to us now. Entries will only be accepted if they contain all three coupons (not copies).

This competition is not open to the staff of Home Computing Weekly, Argus Specialist Publications, Alabaster Passmore, Sinclair Research and Quicksilva. The editor's decision is final and no correspondence will be entered into.

Entry coupon No.2 This must only be sent with coupons from issues 1 and 3.

1 How many stars for Mastermind? .....

2 What did Alan Laird write? .....

3 Program 14's name .....

4 How much profit on the fruit machine .....

5 What does Peter Tootill run?

6 Memory location 755 is called?

7 Atomic waste. What's his highest score? .....

There will be space for your name and address on the coupon in next week's issue.

'No-one beats our prices'

Melvin Beresford, whose company is bringing out a 16K RAM pack for the Jupiter Ace next month, has made this promise: "If someone comes out with one that's cheaper we'll cut our price. And that applies to all our products."

Mr Beresford, 27, chairman and managing director of Cheetah Marketing, expects his £24.95 Jupiter Ace RAM pack to be ready by April or before.

He said: "I think it will be the first — and certainly the cheapest."

He said he kept prices down by paying his sub-contractor's tooling costs of £4,000 to £5,000 for the casing and by using automated production. Some companies, he said, bought ready-made cases; his were specially designed for the job.

At present Cheetah sells two RAM packs for the ZX81 — 16K for £19.75 and 64K at £44.75.

He is hoping for an April launch for a 32K RAM pack for the Spectrum at around £30, which would mean customers could add it to a 16K Spectrum (£125) and get a 48K model at £20 less.

Cheetah Marketing is Mr Beresford, his wife Lesley, 26, and the company secretary, two sales staff and a marketing executive. Mr Beresford, formerly in production in an electronics company, formed Cheetah four months ago.

Cheetah Marketing, 359 The Strand, London W2R 0HS.

New for the BBC

BBC software specialists Acornsoft has five new games to launch this month.

And one of them, according to managing director David Johnson-Davies, has beaten everyone at the company.

All five are priced at £9.95 and run on the BBC model B.

They are: Snooker, a two-player game including features like top and bottom spin, Missile Base, Starship Command and Draughts/Reversi, which use joysticks, and an adventure game, Countdown to Doom.

It is Draughts/Reversi of which Mr Johnson-Davies said: "It's beaten everyone here."

He also said Starship Command was totally original: "The attacking ships behave in an intelligent way — they gang up on you."

Castle of Riddles, an adventure game relased last month, includes a £3,000 competition for which the closing date is March 31.

Acornsoft, 4A Market Hill, Cambridge CB2 3NJ.

Computer talk in the nursery

Just for children, Electroplay has introduced a £50 micro called My Talking Computer.

It has just 30 one-word keys, its own small colour display screen, runs on batteries or mains power and has plug-in program modules with names like Spelling, Music and Languages.

Electroplay says it has been designed as a child's first computer and is suitable for youngsters of three and upwards. It says "hello" when turned on and then the child presses keys as instructed.

In a chauvinist announcement, the company says it is "a computer for kids and mothers... mothers will not feel they have to be computer boffins to feel at ease with it or use it with their children."

Electroplay, producers of Pass Me, "the first talking electronic game", says that My Talking Computer has attracted orders of more than 25,000 from America and potential larger orders for France.

The company says My Talking Computer was designed and assembled in England.

Electroplay, first floor, 93 High Street, Esher, Surrey KY10 9QA

My Talking Computer — speaking to children

What Katy did for Dad

Lew Graham and daughter Katy — facing up to programming

Katy Graham, a 14-year-old schoolgirl, loves making faces for her dad.

She designed the faces on two of Lew Graham's programs for children of four-six — a grin or a grimace on one and an alien with meaningful antennae on another.

Mr Graham, who runs Cottage Software with his wife Margaret, is a maths teacher at a comprehensive school and has an engineering degree.

He said: "Katy has been very useful at finding bugs. She designed the faces which appear as rewards when children get the answers right. I think it's important that a child gets a pat on the back."

Katy, who is studying for O-levels, said: "He kept making a fuss about the shape of the faces."

Isn't it unusual for a girl to be writing programs? Katy said firmly: "I think it's totally irrelevant whether you're a girl or a boy. I just enjoy it."

Now Katy, who has a brother, Andrew, aged 11, and a four-year-old sister, Ruth, has written a program for herself to help with her Latin declensions.

Mr Graham set up his part-time business six months ago and now has four educational cassettes, each with two programs, and a fruit machine game on sale, all for the 32K BBC micro.

Would he eventually have to make it a full-time job? He said: "I would not like to be out of teaching entirely because it keeps you in touch.

"I write the programs in the living room. When the family want to watch TV they have to use the black and white set in the kitchen."

Mr Graham's latest programs are Elem-Add and Elem-Sub, both on the same cassette for £7.50.

Cottage Software, Heather Cottage, Selly Hill, Whitby, North Yorkshire.

New calc for Spectrum

Chartered accountant David Robinson has brought out a £9.95 Spreadsheet program for the 48K Spectrum, called Flexicalc.

He says these features distinguish it from the others: user control over the number of rows and columns, formulae can be changed at any time, full manual designed for first-time users, on-screen prompting of commands and full maths capability, not just add, subtract, divide and multiply.

Mr Robinson, 33, who runs Saxon Computing part-time with his wife Denise from their home on Humberside, said: "I wrote it for myself to use originally."

Mr and Mrs Robinson, who have children of six and eight, formed Saxon as partners 11 months ago.

They are soon to put on sale consolidation and report generator modules, at £6.95 for the two on one tape, which will work with Flexicalc-generated files.

Saxon Computing, 3 St Catherines Drive, Leconfield, Beverly, Humberside.

A NEW SERIES FOR FIRST TIME USERS

"Learning to Use" is a new series of books which introduces newcomers to the most widely used micros in the marketplace.

The books assume absolutely no knowledge about computers and the reader is shown even the most fundamental operations such as "switching on" and "loading a program". The books lead the reader through simple programming and then on to graphics, with several programs which show how to achieve pictures and even animation!

The user-friendly approach is consistent throughout the text – not only are program listings clearly shown, but in many cases, a photograph is included to show what the program looks like when actually loaded and run!

All books in the series are £5.95 (incl. postage). **Gower**

To be published April–June 1983

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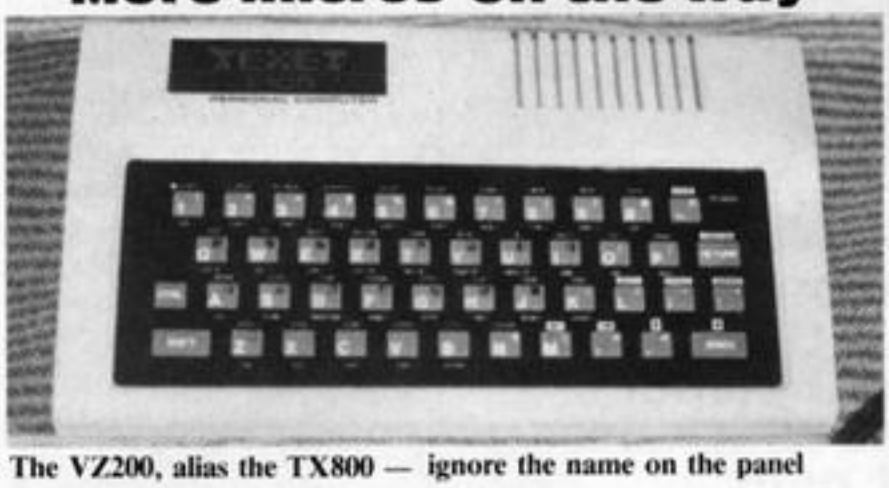
HCW 2

More micros on the way



The VZ200, alias the TX800 — ignore the name on the panel

Richard Abbott — importing two new computers

Texet, best known for its pocket calculators, is challenging Sinclair's Spectrum with a Hong Kong import.

Called the VZ200, it will be on sale here in May-June in John Menzies, Texet's owners, and, through importers Leisure-Zone, in stores like the House of Fraser group.

Texet will be calling it the TX8000 — it has 8K of RAM. Price will be £98, but this may well be discounted by some stores.

It comes with a rubber-like keyboard, BASIC, eight screen colours, single-key commands, user-defined graphics and a range of add-ons, some to follow later.

They will include a plug-in 16K RAM module at £39.95, with 64K later at £49.95, a joystick for £14.95, light pen and a £99 printer. A Centronics-type adaptor is also due. Texet will also be offering a monitor made in Taiwan.

Leisure-Zone managing director Richard Abbott said three software houses were writing for it and 40 programs would be available at launch, including games, educational, home, small business, scientific and technical. There would also be a simple spreadsheet.

He said: "I think its market is the one that's been established by Sinclair — the hobbyist, the student and the enthusiast. It's for someone upgrading from the ZX81 who can't afford a Spectrum."

Leisure-Zone is also importing another computer, called the Creativision, also from Hong Kong and made by the same company. Modular in design, it will cost £99.95, is aimed at the whole family and will run VZ200 software.

A cassette recorder at £39.95 — it will not work with others — plugs into the side and so do memory modules of 16K, at £39.95, and 64K. A floppy disc drive and acoustic coupler are due later. Joysticks will cost £19.95.

A Sinclair spokesman said: "We concede that there is room for newcomers in a growing market. Our share of that market may decline but our sales will continue to rise.

"We have yet to see a serious head-to-head challenger materialise against us."

● Texet's proud claim is to have brought out, in 1971, the first pocket calculator — three weeks before Sinclair. Mr McCormack said: "We will send a writ to anyone who says differently."

Leisure-Zone, The Old Malthouse, 5 The Broadway, Old Amersham, Bucks HP7 0HL. Texet, Texet House, Earl Road, Commercial Avenue, Stanley Green Industrial Estate, Cheadle Home, Cheshire SK8 6PT.

More Dragons on the way

Experts are already at work on a replacement for the best-selling Dragon 32, just seven months after the launch.

It is one of several projects being tackled by Dragon Data's 16-strong technical development department at the company's new Port Talbot plant.

But sales boss Richard Wadman, 44, said: "I see the Dragon 32 lasting for some considerable time — I wouldn't be surprised if we were still selling it in 1985.

"When we bring out a replacement depends on what the opposition does and the way the market goes.

"We've got to consider a machine to come for the bottom end of the market and that's on the drawing board."

Dragon Data's 138 workers are now turning out 20,000 micros a week and 55,000 have been sold since August. Mr Wasman reckons they need to produce 30,000 a month to keep up with demand.

He said: "Demand is growing all the time. There's going to be a struggle for all computer manufacturers to satisfy demand in the next couple of years.

"Most of our purchasers are first-time buyers, with a few trade-ups, so we seem to be producing a lot of new business.

"Soon the micro will take its place in the home like the TV or the hi-fi. The requirement of the user will be heavily software biased. They will require it to do something for them so we need more plug-in facilities, like electronic shopping, banking and databases.

"I'm not happy with the amount of software at present but we are improving our range quite rapidly in the next few months. After all, we only started in August."

Dragon Data's logo reflects its Welsh background

Mr Wadman, a bearded ex-lecturer in statistical computing, said: "We are now beginning to establish a healthy export market in Europe.

"We are also negotiating with people in the States. We have been talking to a large distributor and manufacturers. I would prefer to make it here for export, but there are price advantages in having it made under licence."

These are the products Dragon Data already has lined up:

● A disc drive at £250-£275 to be launched next month. One drive with controller will have a 5¼in single-sided 250K floppy. And there will be space in the same box for a second drive, costing around £200. Other companies are also bringing out disc drives for the Dragon.

Dragon 32 — "... still selling in 1985"

● A £25 tape recorder, brought in and specially adapted. Due for release at the end of next month, Mr Wadman said it was being marketed following demand.

● Boards with 64K of RAM and a multi-tasking disc operating system, called OS9, also next month.

● A new model for more serious users called the Dragon 128, priced at around £400 and for launch in August.

● A top-range model, designed as a system and costing between £1,200 and £2,000. This will be for the professional user and is scheduled for September or October.

● Two graphics printers, using 4in paper for 40 columns and 8in rolls for 80 columns, costing about £150 and using tiny ball-point colour pens. A release date has not yet been set.

Dragon is forecasting a turnover of £35m-£45m this year, with profits of £3m-£4m, which would make it one of the UK's biggest micro companies. Turnover to the end of December was £3m, giving a profit of £200,000 to £300,000.

Dragon Data, Kenfig Industrial Estate, Margan, Port Talbot, West Glamorgan SA13 2PE.

Colour print at a budget price

Remarkable feats can be performed by a tiny newly-launched four colour printer/plotter which uses ballpoint pens. Peter Tootill reports

This attractive little printer, which arrives well packed in polystyrene, measures just 8½in square and 3in high at its maximum. But you get a lot of value for your £149.

There should be no problems connecting it to a wide range of micros with standard parallel or serial outputs. One dealer told me the printer, called the CGP-115 by makers Tandy, was very popular with BBC micro owners.

Setting up is easy. All that's needed is a mains plug for the separate power supply and the appropriate cable to connect the printer to the computer.

To get the printer going you have to set switches to select the relevant input — serial or Centronics parallel — the default for 40 or 80 characters per line and load the 4½in paper roll and pens.

A roll of paper and six special ballpoint pens, three black and one each of red, green and blue, are included.

All this is straightforward and well explained in the 40-page manual which is supplied.

When you switch the printer on it makes an alarming buzzing noise for three or four seconds. This had me rushing to the phone to call the Tandy man to check if it was about to go up in smoke.

Fortunately it is just part of its start-up routine. I assume it is vibrating the pens to help them to start quickly.

The next thing it does is to draw four little boxes, one in each of the four colours. Having made sure that everything is working properly the printer is now ready for use. Using the printer for text is easy. The output is simply sent to the printer using the normal command for your computer ("LPRINT" on the TRS-80). The number of characters per line can be varied from the default value of 80 or 40 characters per line under software control. The range is from 80 to produce letters which, although only about 1mm high, are still quite easy to read, to one. Yes, I do mean one character per line.

The characters for each size of output are all in the same proportion, so that as the number per line decreases, the height of the characters increases. This is different to the normal method of working for dot matrix printers which normally double the width of characters but keep the height the same.

Plotting is controlled by a series of commands that enable the pen to be moved from point to point with or without drawing a line. The destination is specified by giving displacements, either relative (from the present loca-

tion), or absolute (from the currently defined origin).

The manual explains each command well, but there is a lack of more advanced examples, especially in the use of variables to specify the various actions the printer should take. This is a pity as it will be the basis of most of the work that the printer will undertake.

A few simple examples, such as how to draw a circle, or some geometric patterns would have been very helpful, especially to the non-mathematical user.

There is a very nice program in the manual that draws a pie chart, and colours in the sectors, and also produces sine and cosine curves. However, it contains a couple of bugs, and a lot more REMarks would have made it much clearer which sections of the program are carrying out the various actions.

Nevertheless, this program will amply reward careful study with a number of hints on how to use the printer's capabilities. It is easy to output text whilst in graphics mode, and the text can also be printed sideways... or even upside down.

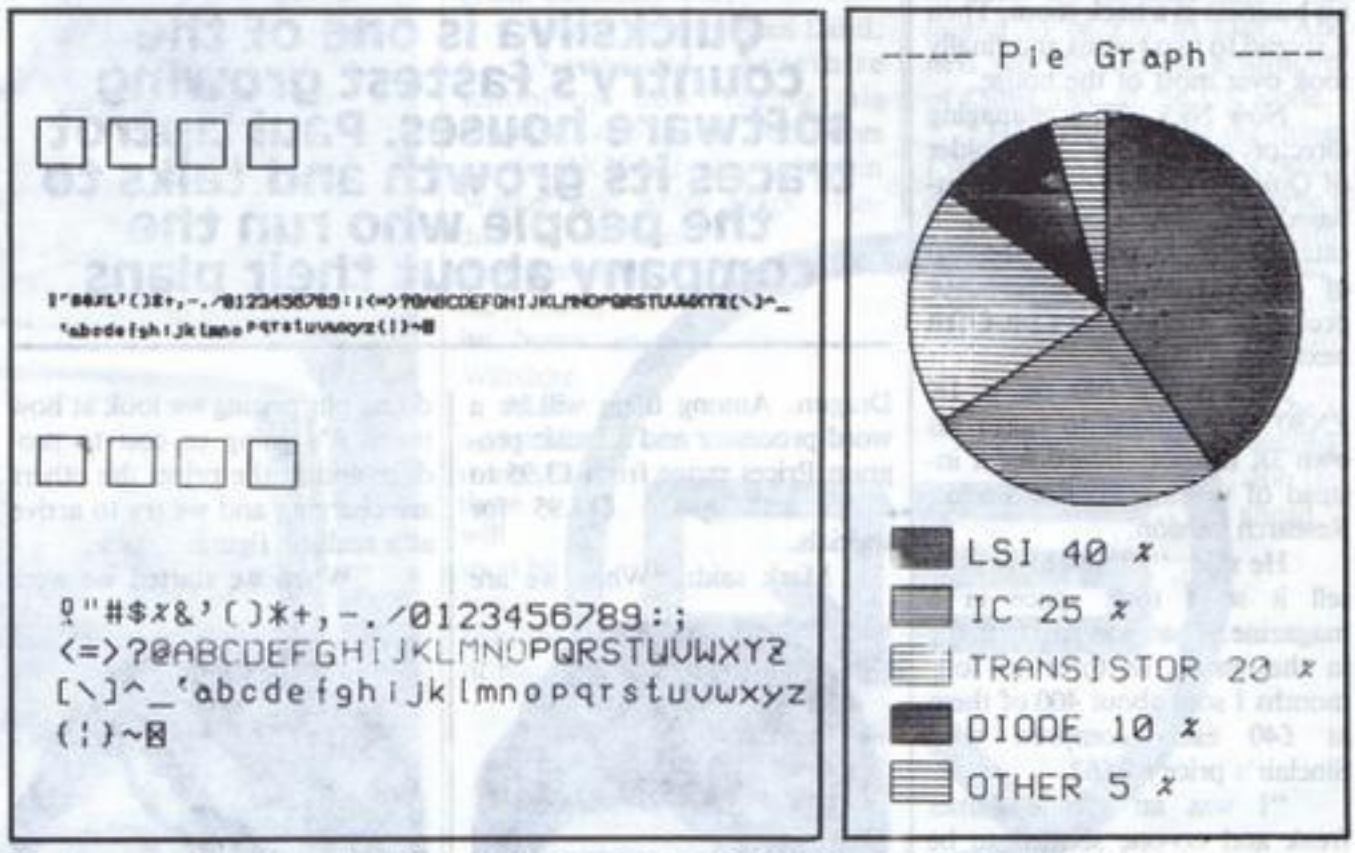
Attractively priced and versatile, the printer's main drawback for general use is its speed, only 12 characters per second when printing. But at the price there is little competition and it should appeal to a wide range of users, not just those who need to produce graphs and diagrams.

Interfacing to different computers shouldn't present any problems, especially as it supports both serial and parallel inputs. However, none of the connections to various pins on the input sockets are given in the manual.

Facts panel

Tandy CGP-115 printer	£149
Paper (three rolls)	£3.99
Pens (pack of three all black, or one each of red, green and blue)	£1.69

Inputs: Centronics parallel and RS-232 serial (600 baud, 7 bits, 2 stop bits)



Test run — character set at 80 and 40 characters per line plus graphics demonstration

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HCW 2

Our story begins with a ZX80 in a back room . . .

Quicksilva is one of the country's fastest growing software houses. Paul Liptrot traces its growth and talks to the people who run the company about their plans

It's almost a computer classic, but Nick Lambert really did start his business in a back room. Then it spread to two rooms and finally took over most of the house.

Now Nick, 32, is managing director and major shareholder of Quicksilva, the Southampton-based software house with a catalogue of 39 tapes by the end of the month and a turnover predicted to reach £5m-£10m next year.

Nick spent £90 on a 1K ZX80 and decided to make his own 3K memory board for it instead of waiting for the Sinclair Research version.

He said: "I thought I could sell it so I took space in a magazine. That was my first toe in the water. In three to four months I sold about 400 of them at £40 each compred with Sinclair's price of £62.

"I was an arcade games freak and no-one seemed to be providing them so, with Rodney Zaks' book in one hand, I wrote Defenda and sold it at £5.50. I was also selling a motherboard and a sound board."

John Hollis, now Quicksilva's technical director, was working in a components shop when Nick met him while buying bits and pieces for a synthesiser project he found in a magazine. He never did finish it.

And Nick met Mark Eyles, now production director, through a friend who said Mark was good at soldering.

Quicksilva became a limited company in April last year and the staff is: Sean de Bray, technical admistrator; Caroline Hayon, sales and marketing; Rod Cousens, international sales manager; Susan Clifton, secretary and Maureen Twine, post.

Now Quicksilva has been trading for 18 months and has offices on four floors overlooking a park.

The company has a catalogue of 23 tapes, nearly all machine code games, for the Spectrum, ZX81, VIC-20, plus a character generator for the Atari.

This month another 16 are being launched, including programs for the BBC micro and the Dragon. Among them will be a word processor and a music program Prices range from £3.95 to £7.95 and up to £14.95 for specials.

Mark said: "When we are doing our pricing we look at how much it's going to cost to produce and at the prices the others are charging and we try to arrive at a realistic figure.

"When we started we were charging £5.50 for a ZX81 program and copying it ourselves. Now the same program would cost £3.95 because we are selling more of them.

"We have tried to keep our prices down to the lowest which are reasonable. If we were selling a program for the ZX81 and then brought it out for the Atari we would have to charge a different price because there would be more to it.

"The machine that I personally like the look of is the Lynx, but we will be producing for all the personal computers. That's our plan. We are just like book publishers, publishing the work of mainly freelance programmers.

"Every two months our turnover has doubled — that's the kind of rate we're growing at. It's absolutely fantastic.

"We've probably got the dubious distinction of being ripped off in almost every country in the world. Now we've got a large firm of accountants with offices in the countries to which we export."

Among the countries Quicksilva sells to are Iceland, Chile, Austrailia, Holland, Denmark, Israel, America, South Africa, Spain, Belgium and Greece.

Mark said: "The number of people who can write programs is finite, but there's lots of them. Many of them can write well, but they are not so good at ideas so we give them the ideas to improve their games.

"We are going to be holding conferences for our programmers — we'll rent a room in a hotel somewhere — and give them loads of games ideas. And we're going to produce a newsletter for them too.

"Some of them are still at school and soon they will be earning more than their parents."

He gave an example of what would happen if someone sent them a tape for the ZX81.

"The market is going to disappear before long because of the Spectrum, so we would say: 'This is a really nice program. Could you write it for the Spectrum?'

"We would provide him

Alan Laird — he wrote Munchees for the ZX81

John Hollis — technical director and writer of Time Gate

Martin Walker — wrote the Magic Window character generator for the Atari

Sean de Bray — Quicksilva's technical administrator

Mark Eyles — "We try to keep our prices down"

with a Spectrum, a monitor, and an assembler and a program of routines called Sub Lib. He would pay us out of his first royalties. That's the kind of support we give."

Quicksilva's programmers, mostly freelance, get 25 per cent of the cover price of each program, excluding VAT.

Among them is Alan Laird, a 15-year-old Ayreshire schoolboy now taking his O-levels, who wrote Munchees for the ZX81. Another is Martin Walker who wrote Magic Window, a character generator for the Atari, at his home in Wiltshire.

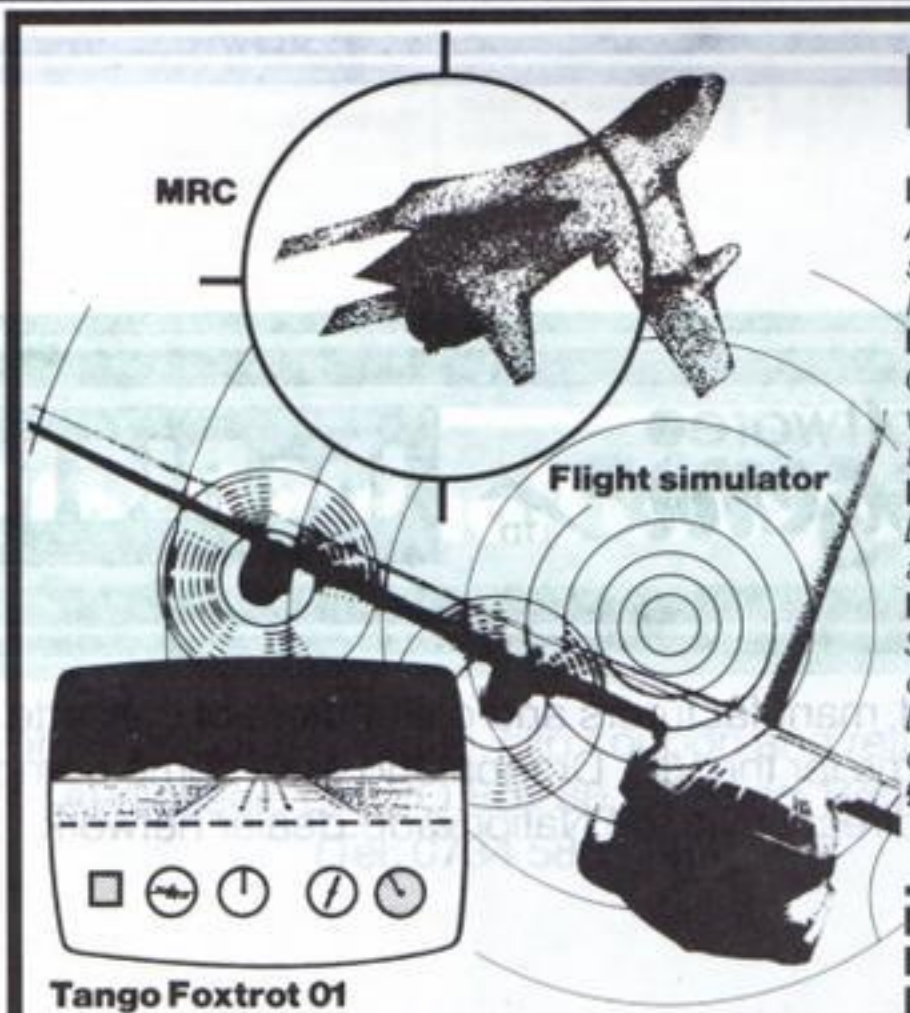
Mark said: "I think there will soon be just a handful of big software houses, but there will still be the little guy in his back room. The gap between big and small will widen.

"We want to stay fairly small in numbers of full-time staff so we can react quickly to market trends."

Nick expects Quicksilva's turnover for the year ending this month to be £½ to £1m. And next year he predicts a turnover of £5m-£10m, in the UK alone.

He said: "One of the things I want to do really soon is take a couple of months off and write a really good program. John Hollis and myself have this friendly rivalry... and he's getting too far ahead."

Quicksilva's logo



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```
LISTING OF LARGE LETTERING
  1 REM Large lettering
  2 REM in MODE0 MODEL'B'
  3 REM By J.P.Riggs
 10 MODE0:VDU23,1;0;0;0;0;
 20 VDU23,255,60,126,255,255,255,255,126,60
 30 VDU23,255,255,255,255,255,255,255,255,255
 40 DIM MEM$(8),L$(3):L$(1)="SMALL-SIZE":L$(2)="SIZE2":L$(3)="BIG"
 50 FORC=1 TO 3:L$=L$(C)
 60   FOR ST=1 TO LEN(L$):A$=MID$(L$,ST,1)
 70     PROCstring(A$,C)
 80     FORE=0 TO 7:PRINTTAB((ST-1)*8+C,E+C)MEM$(E):NEXT:NEXT
 90   TIME=0:REPEAT:UNTILTIME>200:CLS:NEXTC:END
100 DEFPROCstring(AS$,SIZE%):X%=&C000+8*(ASC(AS$)-32)
110 FILL$=STRING$(8*SIZE%,CHR$8)+CHR$10
120 FOR MEM%=0 TO 7:ABC%=MEM%?X%:ABC$=FNother(ABC%,2)
130   ABC$=STRING$(8-LEN(ABC$,"0")+ABC$
140   ABC$=FNconvert(ABC$):MEM$(MEM%)=STRING$(SIZE%,ABC$+FILL$)
150   NEXT:ENDPROC
160 DEFFNother(NUM%,BASE%):H$=""
170 BASE$=LEFT$("0123456789ABCDEF",BASE%)
180 IFNUM% THEN A%=INT(NUM%/BASE%):H$=MID$(BASE$,1+NUM%-A%*BASE%,1)+H$:NUM%=A%:GOTO180
190 =H$
200 DEFFNconvert(ABC$)
210 A$="":FOR A%=1 TO 8:IF MID$(ABC$,A%,1)="0" A$=A$+STRING$(SIZE%,CHR$32)
220   IF MID$(ABC$,A%,1)="1" A$=A$+STRING$(SIZE%,CHR$255)
230   NEXT:=A$
```

My short program contains a procedure called PROCstring which will allow you to draw three sizes of characters with a BBC micro.

By changing the letter C in line 70 to 1, 2 or 3 you can have characters which are eight characters high, 16 characters high or 24 characters in height.

The program will run in any mode, but remember to change the tab positions. In MODE 7 a size three character will take up the whole screen.

The program, which gives a demonstration of sizes, could be used as part of, say, a game.

The procedure sets up the eight strings MEM$(x) which are used to draw the large character.

The characters are stored in the memory as a series of eight bytes from &C000 onwards. Each number is converted to a binary string, then the zeroes converted to SPACEs and the ones converted to CHR$255 in FNconvert.

GE for the small computer

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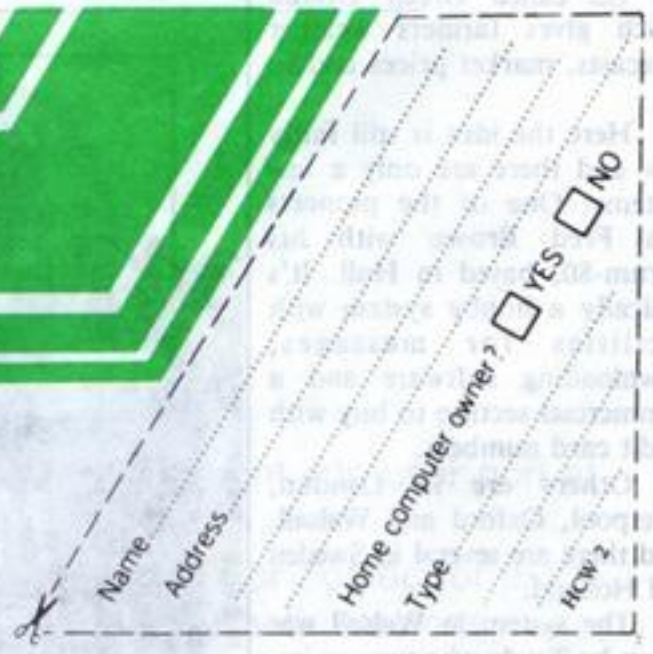


Put your micro on the phone

Dial up a bulletin board and your micro can exchange information over the phone. Peter Tootill, who runs Mailbox-80 in his spare time, tells you how

Your micro can easily talk to other computers. All you need is some simple off-the-shelf software, a modem costing £100-£300... and a telephone.

Then you'll be able to call up other computers, get in touch with "bulletin boards" run by hobbyists and contact large professional systems. You can also use some of Prestel's facilities.

Many of the systems run by enthusiasts offer free software to download into your computer, games-playing with other micro users and even a sort of mail order by micro.

This type of communication is set to boom as micro owners look for new ways of using their computers and big companies latch on to the commercial possibilities.

In America, where phone calls and modems are cheaper, there are hundreds of bulletin boards. The best-known commercial networks are The Source and CompuServe.

Many companies use these systems to keep in touch with their staff. They can collect messages at any time with no postal delays or misunderstandings on the phone.

There is even a network in the US called Green Thumb which gives farmers weather forecasts, market prices and so on.

Here the idea is still fairly new and there are only a few systems. One of the pioneers was Fred Brown with his Forum-80, based in Hull. It's basically a hobby system with facilities for messages, downloading software and a commercial section to buy with credit card numbers.

Others are in London, Liverpool, Oxford and Walsall. And there are several in Sweden and Holland.

The system in Walsall was set up by Tandy who were so impressed with the idea and its potential that they installed it, using a program called Mailbox-80 written by Fred Brown, to enable their shops to keep up to date on new products and handle queries.

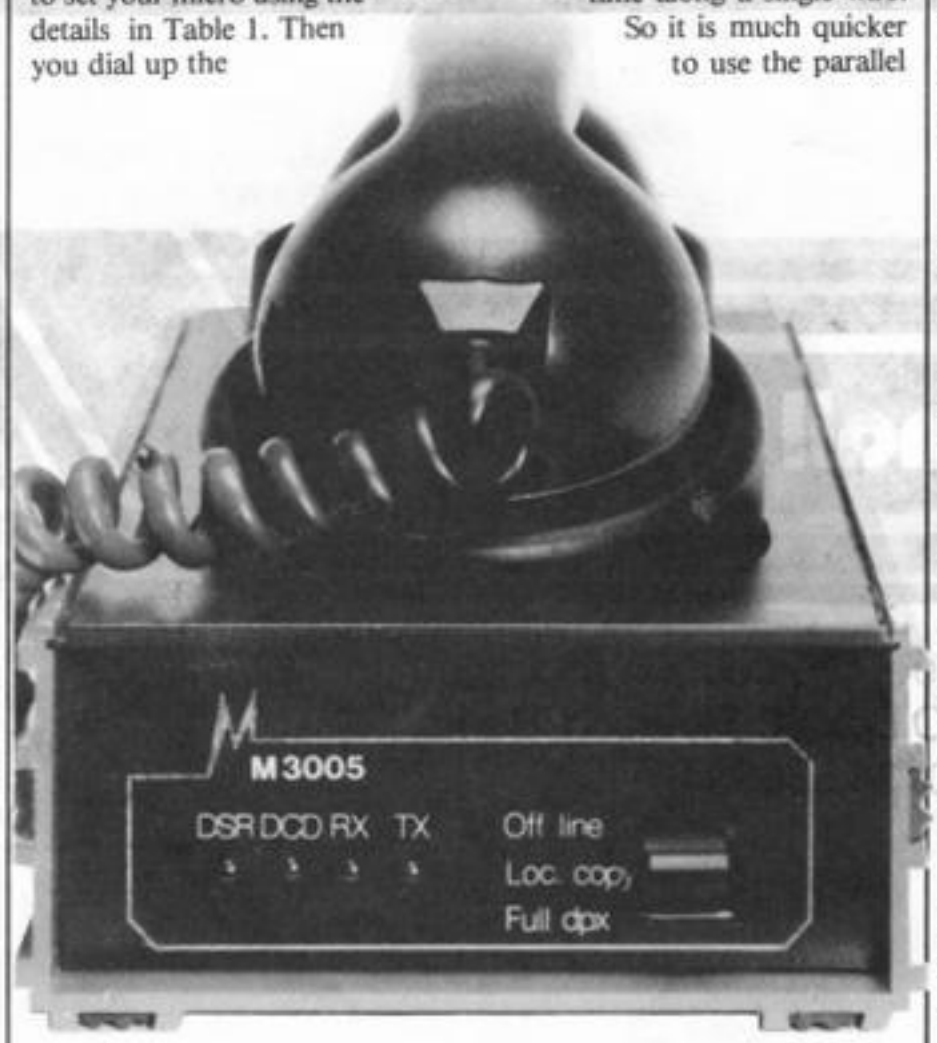
By all accounts it's been very successful and well used. In business terms such a system is cheap — £2,000 for micro, modem and software.

Most recently made personal computers have an RS-232/V.24 serial interface — check your manual — which makes them ideal for communications. There are two types of modem you can buy. One is an acoustic coupler, which means you plug your phone handset into two rubber cups. The other is wired directly to the phone line.

The same company that sold you the modem will usually provide the software too. You'll need to set your micro using the details in Table 1. Then you dial up the bulletin board you have chosen. I have included a list of some of them. You will hear a steady tone. Plug in the handset, switch on and an introductory message will appear on your screen, guiding you to what is available on the system.

Here's how it works in more detail. A special interface is needed to convert the data transmission system a micro uses into a form the outside world can handle.

Most computers move data around along eight wires in eight-bit chunks, instead of one bit at a time along a single wire. So it is much quicker to use the parallel eight-wire system rather than serial, or single-wire system. Both have a further wire called ground or earth.



MiniModem 3005 acoustic coupler from Modular Technology (08692 3361) costs about £149 and will fit almost any type of telephone

You need a serial interface to convert the parallel data in your computer. RS-232 is simply the US standard for serial communications and CCITT V.24 is the European equivalent and is virtually identical.

However the output from the serial interface is still in digital form — zeros and ones represented by voltages.

To transmit this data along telephone lines means converting it into sounds and this is just what a modem does. It modulates the data into tones of two different frequencies, hence the name MODulator/DEModulator.

In practice four tones are used in pairs, two by the caller and two by the answering system so they can transmit at the same time. It's not the recipe for chaos it might seem as this is used for error checking and "handshaking".

This means one system can ask the other "Are you ready for the next batch of data?" and the second can answer "Yes, go ahead" or "Hang on, I'm still dealing with the last lot".

Simultaneous transmission is called duplex and a simpler system where the two take turns is called half duplex.

There is an almost universally standard way of setting up your micro to ensure it is compatible with the one at the other end of the phone line.

The standards are the code used to transmit characters, the speed at which they are transmitted and the frequencies used. In fact, the only problem comes when a European user wants to communicate with a North American system because the frequencies are different, at least at 300 bits per second. Our modems are preset to our system.

So, for trans-Atlantic communications, both ends must make sure they are using either European (CCITT) or US (Bell) standard modems.

If you want to know more about how you can join the communications revolution, contact the operator of your nearest ▶

BULLETIN BOARDS

bulletin board out of system hours at the phone numbers listed in Table 2.

Or, if you have a micro and a modem, set your system to the standards listed in Table 1 and call any of the boards listed.

Keep your calls within the hours given. Most of the systems are run by hobbyists and calls at 2am will not be welcomed...

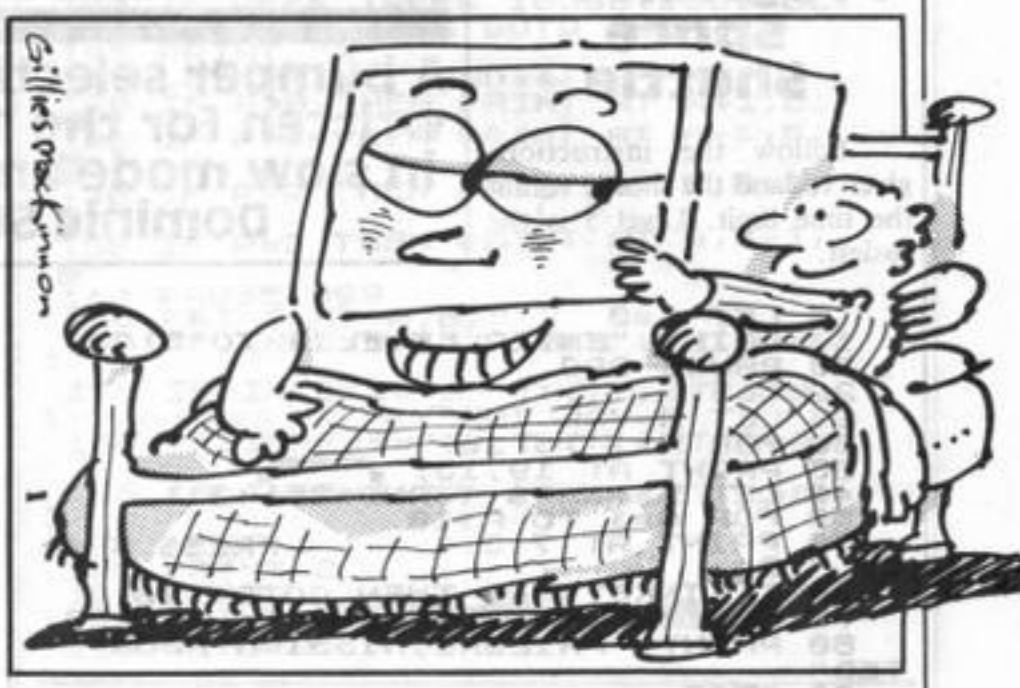
Table 1 — standard settings for communications to bulletin boards

Data speed	300 bits/sec
Word length	7 bits (excl. parity and stop bits)
Parity	Even
Stop bits	1

Shropshire	Remote CP/M	(094875) 378	Daily 11am-3pm, 7-11pm
Kansas	Forum-80 HQ	(0101 816) 861 7040	24 hours
Chicago	CBBS HQ	(0101 312) 545 8086	24 hours
New York	Colour Computer	(0101 212) 441 3755	24 hours
Alabama	Bullet-80	(0101 205) 492 0373	24 hours

Table 2 — computer bulletin boards

Town	System	Phone No.	Times
Hull	Forum-80	(0482) 859169	Tues & Thurs 7pm-10pm
London	CBBS	01-399 2136	Sun 5pm-10pm
Liverpool	Mailbox-80	(051) 220 9733	Mon-Fri 9am-5pm, 7.30-10pm. Weekends 12.30-10pm. Ring once, then dial again
Milton Keynes	Forum-80	(0908) 613004	Daily 9pm-12 midnight
Co Durham	Remote CP/M	(0207) 32447	Phone for times



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HCW 2

Hours of fun: 21 programs for your 1K ZX81

A bumper selection of programs written for the 1K ZX81 running in slow mode and presented by Dominic Stocqueler

Some of these programs will also run in fast mode or on an 8K ROM ZX80, but remember to Poke 16437 with 255 after every Pause statement.

In certain listings the hash symbol (#) appears and this represents a critical space. Lower case characters represent shifted graphic characters.

Program 1 — Space Shuttle

Follow the instructions given to land the shuttle within the time limit. Level 5 is the easiest.

```
  5 LET S=0
 10 PRINT "ENTER LEVEL(1 TO 5)"
 20 PAUSE 999
 22 CLS
 25 LET A=VAL INKEY$
 30 FOR F=1 TO 10
 35 PRINT AT 19,13;"▗▄▄▄▄▄▖"
 40 LET B$=CHR$ ((RND*26)+31)
 50 FOR G=1 TO A*10
 60 PRINT AT 7,3;"        PRESS K
EY ";B$
 70 IF INKEY$=B$ THEN GOTO 100
 75 NEXT G
 80 PRINT "FAILURE,MISSION ABOR
TED"
 90 STOP
100 PRINT AT 7,3;"STEP ";F;" CO
MPLETE  "
105 FOR H=1 TO A*10
107 NEXT H
108 PRINT AT F+7,14;"  "
109 PRINT AT F+8,14;"▗▄▖"
110 NEXT F
120 PRINT AT 7,3;"MISSION COMPL
ETE"
```

Program 2 — Skier

This program and Program 3 illustrate the difference in speed between BASIC and machine code. Here the object is to ski as far down the course as possible without crashing into the trees. Keys 5 and 8 move left and right respectively.

```
5 LET A=10
7 FOR F=1 TO 1000000
10 PRINT AT 10,RND*28;"Y"
20 SCROLL
30 PRINT AT 7,A;
40 IF PEEK (15398+256*PEEK 16399)=62 THEN
GOTO 300
50 PRINT "+"
55 PRINT AT 7,A;"."
60 IF INKEY$="5" AND A>1 THEN LET A=A-1
70 IF INKEY$="8" AND A<28 THEN LET A=A+1
100 NEXT F
300 PRINT F
310 PAUSE 999
320 CLS
330 RUN
```

Program 3 — Starship

Machine code plus BASIC.

Guide your ship through a star field without colliding with a star. Key N moves left and key M moves right.

```
10 REM .........
20 FOR F=16514 TO 16522
30 INPUT M
40 PRINT F,M
50 POKE F,M
60 NEXT F
```

Run this short program and enter the numbers below

1 0 0 42 14 64 78 201

Delete lines 20 to 60 and add:

```
15 LET A=10
17 FOR F=1 TO 9999
20 PRINT AT 10,RND*30;"*"
30 SCROLL
50 PRINT AT 0,A;
60 IF USR 16514=23 THEN GOTO 100
70 PRINT "U"
80 IF INKEY$="M" THEN LET A=A+1
90 IF INKEY$="N" THEN LET A=A-1
95 NEXT F
100 PRINT " SCORE:";F
110 PAUSE 9999
115 CLS
120 RUN
```

Program 4 — Mastermind

Guess the four-digit number the computer holds. Each digit of your entry should be between 0 and 6. A black square represents the right number in the right position and a grey square represents the right number in the wrong position.

```
  10 LET A=INT (RND*7)
  20 LET B=INT (RND*7)
  30 LET C=INT (RND*7)
  40 LET D=INT (RND*7)
  45 FOR Y=1 TO 100
  50 INPUT A$
  55 LET Z$=""
  60 PRINT AT 15,2;A$
  70 LET E=VAL A$(1)
  80 LET F=VAL A$(2)
  90 LET G=VAL A$(3)
 100 LET H=VAL A$(4)
 110 IF A=E AND B=F AND C=G AND
D=H THEN GOTO 500
 120 IF D=E OR D=F OR D=G OR D=H
 THEN LET Z$=Z$+"▒"
 130 IF B=E OR B=G OR B=H OR B=F
 THEN LET Z$=Z$+"▒"
 140 IF C=E OR C=F OR C=H OR C=G
 THEN LET Z$=Z$+"▒"
 150 IF A=F OR A=G OR A=H OR A=E
 THEN LET Z$=Z$+"▒"
 170 IF B=F THEN GOSUB 300
 180 IF A=E THEN GOSUB 300
 185 IF D=H THEN GOSUB 300
 190 IF C=G THEN GOSUB 300
 195 PRINT AT 16,3;Z$
 200 SCROLL
 205 SCROLL
 210 NEXT Y
 300 LET Z$=Z$(2 TO ).
 310 LET Z$=Z$+"■"
 320 RETURN
 500 PRINT "CORRECT IN ";Y;" GUE
SSES"
1000 IF C=G THEN
     GOSUB 300
```

Program 5 — Trap

Make as many moves as possible without moving onto a black square. Movement is controlled by keys 5, 6, 7, and 8.

```
  10 LET A=VAL "3"
  20 LET B=VAL "5"
  30 GOSUB 200
  40 FOR F=1 TO 6
  50 PRINT "■                    ■"
  60 NEXT F
  70 GOSUB 200
  80 FOR C=1 TO 999
  90 PRINT AT A,B;
 100 IF PEEK (PEEK 16398+256*PEE
K 16399)=128 THEN GOTO 198
 105 PRINT "X"
 115 LET P=INT (RND*4)
 120 IF P=0 THEN PRINT AT A+1,B;
"■"
 125 IF P=1 THEN PRINT AT A-1,B;
"■"
 130 IF P=2 THEN PRINT AT A,B+1;
"■"
 135 IF P=3 THEN PRINT AT A,B-1;
"■"
 140 PAUSE 999
 145 PRINT AT A,B;" "
 150 IF INKEY$="5" THEN LET B=B-
1
 155 IF INKEY$="8" THEN LET B=B+
1
 160 IF INKEY$="6" THEN LET A=A+
1
 165 IF INKEY$="7" THEN LET A=A-
1
 170 NEXT C
 190 PRINT C
 199 STOP
 200 PRINT "■■■■■■■■■■■■■■■■■■■■■■■■"
 210 RETURN
```

Program 6 — Chemistry

This short program will deduce the structure of an atom when given the element's atomic number and atomic mass.

```
10 PRINT AT 0,0;"CHEM 1.1"
20 PRINT AT 3,1;"ENTER ATOMIC NUMBER"
30 INPUT A
40 PRINT AT 3,1;"ENTER ATOMIC MASS ########"
50 INPUT B
60 PRINT AT 3,0;A;"PROTON(S)##########"
70 PRINT A;" ELECTRON(S)"
80 PRINT B-A;" NEUTRON(S)"
90 PAUSE 9999
100 FOR F=1 TO 20
110 SCROLL
120 NEXT F
130 GOTO 10
```

Program 7 — Pattern I

This short listing plots the pattern you see below.

```
10 LET R=0
11 FOR T=0 TO 3000
12 LET X=30-R*COS (T)*2.7
13 LET Y=20-R*SIN (T)*2
14 PLOT X,Y
15 LET R=R+0.005
16 NEXT T
```

Program 8 — Fruit Machine

Try this program only if you feel lucky...

```
 10 LET S=VAL "50"
 11 PRINT "PRESS ANY KEY TO SPI
N"
 12 PRINT AT 6,2;"          "
 13 PRINT AT 7,2;"  A  B  C  "
 14 PRINT AT 8,2;"          "
 18 PRINT AT 9,2;"          "
 19 PRINT AT 10,2;"          "
 20 PAUSE 255
 30 FOR F=1 TO 3
 40 LET A=INT (RND*9)
 50 LET B=INT (RND*9)
 60 LET C=INT (RND*9)
 70 PRINT AT 9,3;A
 80 PRINT AT 9,5;B
 90 PRINT AT 9,7;C
100 NEXT F
120 LET S=S-10
130 IF A<B AND B<C THEN LET S=S
+20
140 IF A>B AND B>C THEN LET S=S
+20
150 IF A=B AND B=C THEN LET S=S
+50
160 PRINT AT 12,0;"YOUR MONEY=$
";S
173 FOR P=1 TO 100
175 NEXT P
176 IF S=0 THEN GOTO 300
180 CLS
200 GOTO 11
300 PRINT "SORRY YOU HAVE RUN O
UT OF MONEY"
```

Program 9 — Guess the Number

A classic computer game with full instructions included.

```
10 PRINT "HELLO, WHAT IS YOUR NAME?"
20 INPUT A$
30 CLS
35 PRINT "RIGHT THEN ";A$
40 PRINT "I AM GOING TO THINK OF A
NUMBER BETWEEN 1 AND 100, YOU HAVE
TO TRY AND GUESS IT."
50 PRINT "I WILL GIVE YOU CLUES"
50 PAUSE 200
70 CLS
80 LET Z=INT (RND*100)+1
90 PRINT "ENTER YOUR GUESS NOW"
100 FOR F=1 TO 1000
110 INPUT X
120 PRINT AT 10,0;X;"#";
130 IF X>Z THEN PRINT "TOO HIGH";
140 IF X<Z THEN PRINT "TOO LOW";
150 IF Z=X THEN GOTO 200
160 PRINT "#TRY AGAIN"
170 SCROLL
180 NEXT F
200 PRINT "WELL DONE#";A$
210 PRINT "GUESSED
IN#";F;"#ATTEMPTS"
```

Program 10 — Etch

A program to draw lines in the directions shown on keys 5, 6, 7 and 8. Key zero will clear the screen, key 9 will copy the screen if a printer is attached and keys 1 and 3 determine whether a black or white line is drawn.

```
  5 LET S=1
 10 LET A=30
 20 LET B=20
 30 IF S=1 THEN GOSUB 300
 35 IF S=0 THEN GOSUB 400
 40 IF INKEY$="8" AND A<62 THEN
LET A=A+1
 50 IF INKEY$="5" AND A>0 THEN
LET A=A-1
 60 IF INKEY$="6" AND B>0 THEN
LET B=B-1
 70 IF INKEY$="7" AND B<42 THEN
LET B=B+1
 80 IF INKEY$="0" THEN CLS
 90 IF INKEY$="1" THEN LET S=0
100 IF INKEY$="3" THEN LET S=1
110 IF INKEY$="9" THEN COPY
200 GOTO 30
300 PLOT A,B
310 UNPLOT A,B
320 PLOT A,B
330 RETURN
400 UNPLOT A,B
410 PLOT A,B
420 UNPLOT A,B
430 RETURN
```

Program 11 — VAT

Enter an account name and job cost and this program will print out in tabular form the value added tax on the job cost and VAT plus the job cost. The program also keeps running totals when "end" is entered as the account name.

```
  5 LET A=0
 10 LET B=0
 20 PRINT AT 17,0;"ACCOUNT    CO
ST     VAT     TOTAL "
 25 INPUT D$
 27 IF D$="END" THEN GOTO 100
 30 INPUT E
 35 LET A=A+E
 40 LET F=(INT (E*15))/100
 45 LET B=B+F
 60 PRINT AT 18,0;D$
 65 PRINT AT 18,10;"£";E
 70 PRINT AT 18,18;"£";F
 75 PRINT AT 18,25;"£";E+F
 80 SCROLL
 85 GOTO 25
100 PRINT "TOTAL COST=£";A
110 PRINT "TOTAL VAT=£";B
120 PRINT "TOTAL COST+VAT=£;";A
+B
130 COPY
```

Program 12 — Kaleidoscope

Watch the pattern build up five by five. Variations can be achieved by altering the value of R in line 10, T in line 20 and the value added to R in line 60.

```
10 LET R=0
20 FOR T=0 TO 3000
30 LET X=30-R*COS (T)*3
40 LET Y=35-R*SIN (T)*3
50 PLOT Y-20,X
55 PLOT Y,X
56 PLOT Y-10,X-10
57 PLOT Y,X-20
58 PLOT Y-20,X-20
60 LET R=R+0.03
70 NEXT T
```

Program 13 — Maze

The aim of this game is to direct the X from one side of the maze to the other. A harder maze is generated after each success.

```
5 LET A= VAL "200"
6 LET X= VAL "0"
7 LET Y= VAL "5"
9 PRINT AT 0,14;"LEVEL:";A/25
10 FOR F=1 TO 10
20 PRINT "14 inverse spaces"
30 NEXT F
40 FOR G=1 TO A
50 PRINT AT 1+RND*9,RND*12;"#"
```

```
60 NEXT G
80 PRINT AT X,Y;
90 IF PEEK (PEEK 16398+256*PEEK
   16399)

=128 THEN GOTO 200
100 PRINT "X"
110 IF INKEY$="5" THEN LET Y=Y-1
120 IF INKEY$="8" THEN LET Y=Y+
130 IF INKEY$="6" THEN LET X=X+1
140 IF INKEY$="7" THEN LET X=X-1
145 IF X)11 THEN GOTO 160
150 GOTO 80
160 PAUSE 9999
170 FOR F=1 TO 14
180 SCROLL
185 NEXTF
190 LET A=A-25
195 GOTO 6
200 PRINT AT X,Y;"CRASH"
```

Program 14 — Clef

This program will print a treble clef and then plot a note on one of the lines. It will then name the note and repeat the process.

```
 10 FOR F=5 TO 9
 20 PRINT AT F,0;"--------"
 30 NEXT F
 40 PRINT AT 5,1;" ▄▀ "
 50 PRINT " ▐ ▌"
 60 PRINT "▐▀▀▌"
 70 PRINT " ▀▄▀ "
 80 PRINT AT 9,1;"▀▄▄▀"
 90 PRINT AT 10,1;" ▐▌"
100 PRINT AT 11,1;" ▐▌"
110 PRINT AT 12,1;"▀▀"
120 PRINT AT 4,2;"▗▘"
130 PRINT AT 3,2;"▐▖"
140 PRINT AT 2,2;"▝▖"
150 PRINT AT 1,3;"▝"
200 GOSUB 500+INT (RND*5)*10
210 PRINT AT 0,5;"O";
220 PRINT A$
225 PAUSE 50
230 RUN
500 LET A$="E"
505 LET O=VAL "5"
507 RETURN
510 LET A$="F"
515 LET O=VAL "6"
517 RETURN
520 LET A$="G"
525 LET O=VAL "7"
527 RETURN
530 LET A$="A"
535 LET O=VAL "8"
537 RETURN
540 LET A$="B"
545 LET O=VAL "9"
550 RETURN
```

Program 15 — Munch

Eat as many black squares as possible within the time limit. Keys Q and A move up and down and keys Z and X move right and left.

```
10 REM see line 10 program 3.
11 LET A=VAL "10"
12 LET B=VAL "10"
15 LET Z=VAL "0"
70 FOR F=1 TO 50
100 FOR G=1 TO 10
110 PRINT AT A,B;

120 IF USR 16514=128 THEN LET Z=Z+5
130 PRINT "X"
135 PRINT AT A,B;"#"

140 IF INKRY$="Z" THEN LET B=B-1
145 IF INKEY$="X" THEN LET B=B+1
150 IF INKEY$="A" THEN LET A=A+1
155 IF INKEY$="Q" THEN LET A=A-1

170 NEXT G
175 PRINT AT RND*14,RND*22;"inverse
    space"

180 NEXT F
190 PRINT "TIME UP"
200 PRINT"SCORE:";Z
```

Program 16 — Simon Says

The computer will flash a letter or number on the screen and you have to enter it, plus any previous letters or numbers. If your answer is wrong the computer will show the mistakes and give a score.

```
5 LET C$=""
10 PRINT "1-NUMBERS"
15 PRINT "2-LETTERS"
20 PRINT "3-LETTERS+NUMBERS"
25 PAUSE 999
30 LET B=VAL INKEY$
33 CLS
35 IF B=1 THEN LET A=28+INT (RND*10)
40 IF B=2 THEN LET A=38+INT (RND*26)
50 IF B=3 THEN LET A=28+INT (RND*36)
60 LET C$=C$+CHR$ A
70 PRINT AT 7,7;CHR$ A
75 FOR F=1 TO 10
80 NEXT F
85 PRINT AT 7,7;"#"
90 INPUT D$
100 IF NOT D$=C$ THEN GOTO 200
120 GOTO 35
200 PRINT AT 9,0;"WRONG,THE ANSWER WAS-"
210 PRINT AT 10,3;C$
220 PRINT "YOU ENTERED-"
230 PRINT AT 12,3;D$
240 PRINT "YOUR SCORE IS ";LEN C$-1
250 PRINT AT 14,0;"ANOTHER GAME? (Y/N)"
260 PAUSE 999
270 IF INKEY$="Y" THEN RUN
```

Program 17 — Space Maze

Visibility is poor, but your mission is to fly through a narrow gorge without hitting the sides or any other obstructions. Key 5 moves your ship left and key 8 moves it right.

```
5 LET Z=VAL "12"
10 LET B=VAL "10"
20 FOR T=1 TO 10000
35 LET A$=""
40 FOR F=1 TO 2+RND*6

50 LET A$=A$+"inverse space"
60 NEXT F
70 IF RND(.2 AND LEN A$)4THEN
LET A$(1+RND*3)="#"

80 PRINT AT 10,B;A$
90 SCROLL
100 IF RND).5 AND B(25 THEN LET
B=B+1

110 IF RND(.5 AND B)1 THEN LET
B=B-1
120 PRINT AT 5,Z;
130 IF T)6 AND PEEK (16398+256*PEEK
    16399)

()128 THEN GOTO 2000
140 PRINT "X"
145 PRINT AT 5,Z;"inverse SPACE"
150 IF INKEY$="5" THEN LET Z=Z-1
160 IF INKEY$="8" THEN LET Z=Z+1
170 NEXT T

2000 PRINT T-G
2010 PAUSE 9999
2020 CLS
2030 RUN
```

Program 18 — Sequences

Is your brain a match for the computer? Try finding the next number in the sequence it displays.

```
1 LET K=VAL "0"
3 FOR X=0 TO 100
5 LET C=INT (RND*3)
10 LET A=INT (RND*10)+5
20 LET B=INT (RND*10)+5
23 PRINT AT 0,0;"SCORE=";K;"/";X
25 PRINT "COMPLETE THE SEQUENCE-"
30 FOR F=1 TO 5
40 GOSUB 100+INT (C*5)
50 PRINT INT A;"#";
60 NEXT F
70 PRINT
80 INPUT Z
85 GOSUB 100+INT (C*5)
90 IF Z=INT A THEN GOTO 200
95 PRINT "WRONG. ANSWER=";INT A
97 GOTO 300
100 LET A=A+B
103 RETURN
105 LET A=A-B
107 RETURN
110 LET A=A*B
113 RETURN
115 LET A=A/B
117 RETURN
200 PRINT "CORRECT"
250 LET K=K+1
305 FOR H=1 TO 4
310 FOR F=1 TO 10
315 NEXT F
320 SCROLL
325 NEXT H
330 NEXT X
```

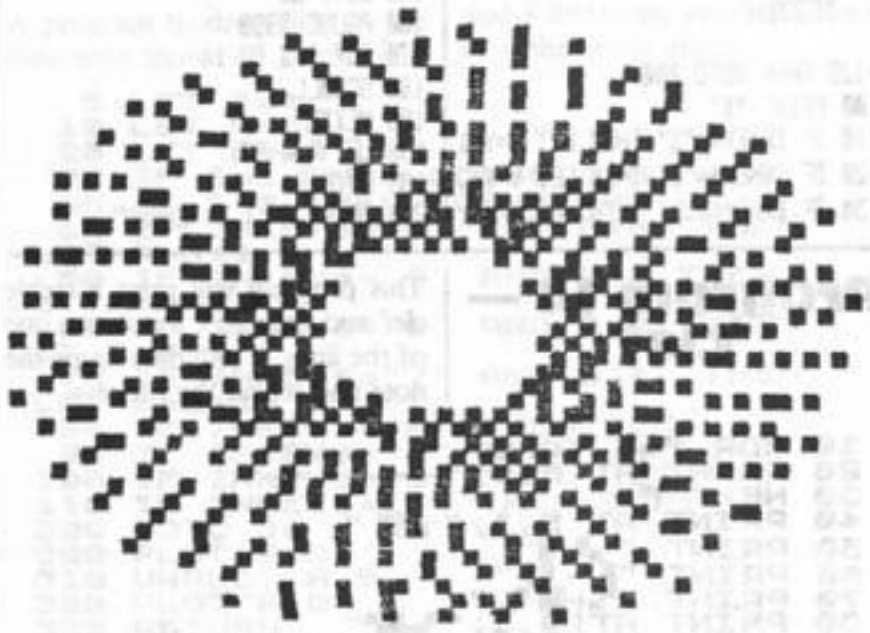
Program 19 — Junior Maths

This program poses 10 simple arithmetic questions. It will also tell you how many answers were correct.

```
5 LET Z=0
10 FOR F=1 TO 10
20 LET A=INT (RND*10)+1
30 LET B=INT (RND*10)+1
40 LET C=INT (RND*4)
50 PRINT AT 0,0;"WHAT IS"
60 PRINT
70 PRINT A;CHR$(21+C);B;"#?"
80 IF C=0 THEN LET A=A+B
90 IF C=1 THEN LET A=A-B
100 IF C=2 THEN LET A=A*B
110 IF C=3 THEN LET A=A/B
120 INPUT X
130 IF X=A THEN PRINT "CORRECT"
140 IF X=A THEN LET Z=Z+1
150 IF NOT X=A THEN PRINT "WRONG. THE
    ANSWER
=";INT A
155 PAUSE 9999
157 CLS
160 NEXT F
170 PRINT
180 PRINT "YOU SCORED#";Z;"#OUT OF 10"
```

Program 20 — Pattern II

A simple program to plot the pattern shown.



```
10 LET R=3
11 FOR T=0 TO 1000
12 LET X=30-R*COS (T)*2.7
13 LET Y=20-R*SIN (T)*2
14 PLOT X,Y
15 LET R=R+0.015
16 NEXT T
```

Program 21 — Sewer

You have just fallen down an endless sewer. Beware of touching the sides or the contents. This is not a game for the faint hearted.

```
1 REM see program 3 line 10
5 LET Q=VAL "7"
6 GOSUB 2000
7 LET Q=VAL "15"
8 GOSUB 2000
10 LET A=VAL "0"
20 LET B=VAL "10"
25 FOR F=1 TO 100000
30 PRINT AT A,B;
40 IF USR 16514=128 THEN GOTO 1000
45 PRINT"V"
47 PRINT AT A,B;"#"
50 IF INKEY$="Z" THEN LET B=B-1
55 IF INKEY$="M" THEN LET B=B+1
90 LET A=A+1
100 IF A=19 THEN LET A=0
110 IF RND).9 THEN PRINT AT RND*19,
7+RND*7;"inverse space"
200 NEXT F
1000 PRINT F
1001 STOP
2000 FOR F=0 TO 19
2010 PRINT AT F,0;"inverse space"
2030 NEXT F
2040 RETURN
```

■

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SOFTWARE

Dragon's Lair and Joust

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MONSTERS IN HELL

If it wasn't actually a nightmare, then it certainly seemed like one... trapped in Hell with the all - consuming flames below me being chased by vampire monsters through a mad maze of ladders and platforms. But I had Holy Power on my side, and a hammer which could magically create holes - the only way to kill these crazy monsters seemed to be to make them fall to a lower level! But just then, the Mad Monk sent his Ghouls after me... Any ZX Spectrum.

MILLIPEDE

Milli the Millipede seemed indestructable; as soon as I shot a part of her, the rest of her just kept on coming! But I was faster, she wouldn't get to me... just then Sid the Spider appeared causing me to swerve and lose my aim. And what's this!?? Scorpi the Scorpion dive bombing me with her indestructable fleas which leave more of those blasted mushrooms to spoil my aim! Quite the most delectable version of the arcade favourite for any ZX Spectrum.

COSMIC SWARM

OK, I accept that I'm to blame. I was warned against entering the Proxima Centauri Sector without an escort. And now I'm in the midst of a swarm of alien egg-like forms, collision seeming imminent I fire, they break open revealling strange alien types which fly wildly around. I fire again as if my life depended upon it - then two of the forms fuse into a single mutant which chases me! One of the most original shoot-em-up space games to appear. Any ZX Spectrum.

ALL GAMES £5.95

Joust

Its taken America by storm - now its available for your ZX Spectrum! In this amazing new arcade game you ride an ostrich and Joust with the Dark Lords on their buzzards in a fantasy land where anything can happen - and it usually does. You control your mounts wing-flap and direction of flight in this fast and furious game of wits. Any ZX Spectrum - Available very soon!

Dragon's Lair

I thought it would be easy... explore the Dragon's Lair, find the legendary Crystal of power and be gone before he knew of what was happening. More fool I, for he was there all right waiting for me, and that imp which followed me everywhere with no other seeming purpose than to steal my compass without which I was well and truely lost! The ultimate Maze-Adventure game for the 48K Spectrum.

FIREBIRDS

They swoop, they dive, they turn figures of eight. The most amazing Hi-Res shoot-em-up arcade type game to come out in ages! Can you survive? Any ZX Spectrum.

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SOFTEK SOFTWARE

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HCW 2

Save your country from atomic waste

Just you and your laser gun can rescue us from the radioactive threat in this Commodore 64 program by David Rees

Radioactive wreckage is falling all over your country, glowing brighter as it drops.

How many pieces can you stop before your five lives are lost?

To move your ship use the cursor keys, up for left and across for right. Key f7 fires the laser gun. Three different pieces drop from the top of the screen. The bar is worth 10 points, the ring 20 points and the diamond is worth 30 points.

However, you have to destroy all the pieces. If any of them touch the ground, you lose a life. When all your lives are lost, the game is over.

Conversion to most other machines should be fairly easy. Wreckage and your ship are Poked on to the screen, so addresses should be changed. However, on machines with high resolution screens, such as the Spectrum or the BBC micro, Printing is easier, unless you want to resort to machine code.

All lines involving colour have REMs before them so they can be changed or removed easily. Monochrome computers have no need of them so lines 110-180 can probably be left out.

The program can be made to fit any screen width. AN is the screen width variable. For screens of less than 32 columns, AN = 15. For 32 to 63 column screens, AN = 31 and for higher values AN = 63. Finally, SC should equal the number of screen columns.

My highest score is 910. Good luck — and keep your head down.

```
2 REM* INITIALISE *
5 V=53248:AN=31:BN=AN*8+7:CS=40
9 REM* COLOUR *
10 A$="
20 PRINT"J","     CATCH  COSMUS"
30 PRINT,"     BY DAVID REES"
40 L=5:X=16:S=0
50 B(0)=73:B(1)=87:B(2)=90
60 A(0)=0:A(1)=0:A(2)=0
69 REM* COLOUR *
70 POKE V+32,0:POKE V+33,0
80 PRINT"PRESS ANY KEY TO START"
90 GET B$:IF B$="" THEN 90
100 PRINT"J SCORE=",,"LIVES LEFT= 5"
110 FOR ROW=1 TO 23
119 REM* COLOUR *
120 PRINTMID$(A$,ROW,1);
125 REM* 40 SPACES *
130 PRINT"
140 NEXT ROW
150 FOR N=0 TO 39
159 REM* COLOUR *
160 POKE 56256+N,3
170 NEXT N
180 PRINT"
197 REM
198 REM* MAIN ROUTINE *
199 REM
200 GETA$
220 IF A$="" THEN GOSUB 500
240 C=X:IF A$="" THEN X=X-1
250 IF A$="" THEN X=X+1
```

COMMODORE 64 PROGRAM

```
260 X=X AND AN
270 POKE1988+C,32:POKE1988+X,65
280 D=INT(RND(1)*10)
290 IF D=5 THEN GOSUB 700
299 REM* PIECE POSITION ADD *
300 FOR N=0 TO 2
310 IF A(N)=0 THEN 370
315 A=X(N)
320 X(N)=(((X(N)-3)*8)ANDBN)/8+3.5
330 B=Y(N):Y(N)=Y(N)+1
340 IF Y(N)>24 THEN L=L-1:GOTO800
350 POKE1024+A+B*CS,32
360 POKE1024+X(N)+Y(N)*CS,B(N)
370 NEXT N
380 PRINT"■",S
400 GOTO 200
499 REM* FIRE LASER *
500 FOR Y=23 TO 1 STEP -1
510 P=1028+X+Y*CS
520 R=PEEK(P)
530 IF R<>32 THEN 600
540 POKEP,66
560 NEXT Y
570 GOTO 650
600 N=-(R=87)-(R=90)*2
610 S=S-(R=73)*10-(R=87)*20-(R=90)*30
620 A(N)=0
630 POKE1024+X(N)+Y(N)*CS,32
650 FOR Y=24 TO 1 STEP-1
660 POKE1028+X+Y*CS,32
670 NEXT Y
690 RETURN
699 REM* INITIALISE DROPING PIECE *
700 FOR N=0 TO 2
710 IF A(N)=0 THEN 740
720 NEXT N
730 RETURN
740 A(N)=1:Y(N)=1
750 X(N)=INT(RND(1)*AN-1)+4
790 RETURN
799 REM* IF PIECE HITS GROUND *
800 PRINT"■",,"LIVES LEFT=";L
810 IF L<1 THEN GOTO 1000
820 A(N)=0
830 POKE1024+A+B*CS,32
840 GOTO 370
997 REM
998 REM* END *
999 REM
1000 FOR N=0 TO 999:NEXT
1010 PRINT"■■","YOUR SCORE WAS"
1020 PRINT,"■■■"S
1030 FOR N=0 TO S/100
1040 PRINT"WELL DONE!"
1050 NEXT N
1060 PRINT"■■O YOU WANT ANOTHER GO(Y/N)"
1070 INPUT A$
1080 IF A$="Y" THEN 10
1090 IF A$="N" THEN END
1100 GOTO1060
```


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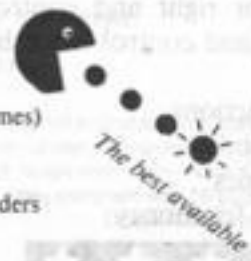

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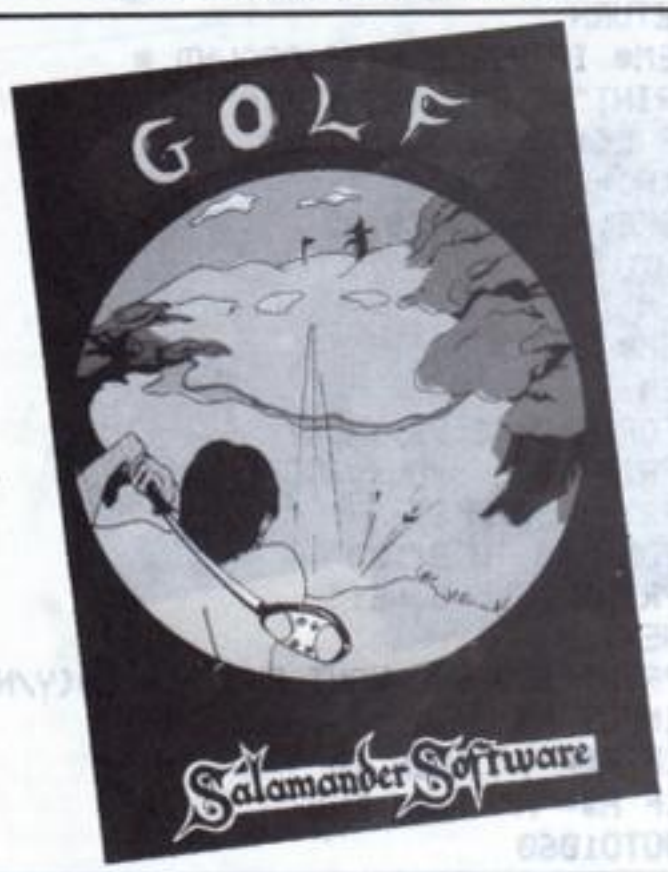


Golf Dragon 32 £7.95

Salamander Software, 27 Ditchling Rise, Brighton, East Sussex, BN1 4QL.

Good value and an excellent representation of the real game, complete with handicapping and choice of clubs.

There are nine holes — go round twice for 18 — each shown first at the end of the fairway and then in close up. Use the up and down arrow keys to place your cursor in front of the ball, choose your club from the menu and then hit the space bar.

Wind direction and force on the fairway is shown by a red arrow; on the green the arrow indicates direction and angle of slope.

Shots played from the rough, shown in green, won't travel so far and shots from hazards — yellow bunkers and trees — will be even shorter. If you're unlucky enough to drive out of bounds or into a pond, both shown in red, your ball is lost and you play again from the position of your last shot with a penalty of one.

You can play by yourself or with one other player to the standard Stableford points system used for competition golf. This is fully explained on a detailed instruction sheet. The cassette is nicely packaged too.

instructions	80%
playability	80%
graphics	85%
value for money	80%

★★★★

Skramble VIC-20 £9.99

Rabbit Software, 380 Station Road, Harrow, HA1 2DE.

Award yourself the Order of the Galaxy if you reach level eight of this challenging space game, developed from the arcade version.

After running the instructions you find yourself flying above enemy territory armed with bombs and laser guns. Use the lasers to shoot down enemy rockets and the bombs to destroy their buildings.

You must hit every fuel dump to ensure you have enough fuel to reach the game's higher levels.

The eight levels are: landscape, landscape with enemy rockets, a tunnel which tests your navigation, a cavern, meteor trail, rocket city, city maze and homing slot.

If you own a joystick use it for faster play. Key controls are @ for up, / for down, : for left, = for right and control L for laser and control B for bomb.

instructions	80%
playability	90%
graphics	85%
value for money	80%

★★★★

Cylon Attack 12K Atom £4.95

A & F Software, 830 Hyde Road, Gorton, Manchester.

A compulsive space game, full of thrills, but loses ratings for its limited use of high resolution graphics. The action slows noticeably as the screen is filled because only the plot and draw routines of the Atom appear to have been used.

The screen gives you a pilot's view of the flight deck with laser gunsights to zap the enemy ships as they prepare to invade Earth.

The top section of the screen shows your score so far, highest score, laser and fuel levels and long range scan.

Two keys control up and down movement and another two are for right and left, making it a little difficult to fire with the space bar.

instructions	80%
playability	70%
graphics	70%
value for money	70%

★★★

Arcadia Spectrum/ VIC-20 £5.50

Imagine Software, Exchange Street East, Liverpool L2 3PN.

A fast-moving and colourful machine code game in the Invaders mould and well up to Imagine's standards.

The dazzling screen display includes throbbing circles, bird-like creatures and spinning deltas. And they all have one purpose in life — to wipe you off the face of the galaxy. You fend them off with your laser gun and move by using the thrust key.

Fast reactions and some fancy fingerwork are needed to survive in one level long enough to reach the next.

The true test of a game like this is the "just one more go" syndrome. And with Arcadia you will find yourself suffering from just that. It is so tempting to try again.

Well packaged and well worth the money.

instructions	80%
playability	80%
graphics	90%
value for money	95%

★★★★

Penetrator Spectrum £6.95

Melbourne House, 131 Trafalgar Road, Greenwich, London SE10.

Great graphics, super sound... and almost impossible to beat. This version of the Scramble-type arcade space game is one of the best so far.

You're the pilot of a spaceship and you have to avoid ground to air missiles and battle your way through four levels to reach your target — a neutron bomb store.

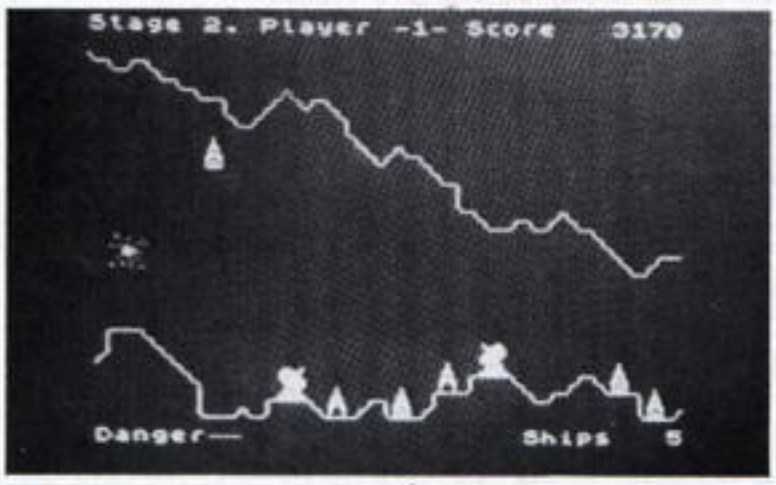
Now your problems begin again. Your bombs — and you've only got two — have to be carefully aimed to fall down a narrow shaft and strike two small targets. Miss one and you can bid farewell to the universe.

There is a special feature which allows you to construct your own terrain through which to fly and another which gives you the chance to train in any of the levels. You'll need it.

One small drawback is that the controls take time to become accustomed to.

instructions	60%
playability	90%
graphics	90%
value for money	80%

★★★★



Arcade Action Dragon 32 £3.95

Apex Trading, 115 Crescent Drive South, Brighton, Sussex.

Two disappointing games, Meteor Run and Breakout... but at a bargain-basement price.

Poor imagination makes the first both clumsy to play and boring. You have to guide your spaceship — represented by two graphics characters — past swarms of meteors moving up the screen. These meteors are each constructed out of one graphics character.

Other characters on the screen also have to be destroyed.

None of the keyboard controls, right, left, fire and hyperspace, has a repeat facility which makes moving your spacecraft tricky and cumbersome.

Breakout also suffers from this lack of a repeat feature. It's just another fairly standard version of the classic game.

It just goes to prove that, in games as in everything else, you get what you pay for.

instructions	40%
playability	20%
graphics	15%
value for money	25%

★

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An accurate interpretation of the game of golf written by a keen club player. Allows match play between two players or one player may play using the Stableford points system widely used for competition golf. Features full club selection, hazards, out of bounds and player handicaps. Dragon Data Approved

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Maths can be fun . . . with a micro

Smiling or frowning faces greet the answers when a youngster uses John Cullen's VIC-20 program

If your youngster is a little slow on mental arithmetic my program for the VIC-20 could be just what you are looking for. It actually makes maths fun.

Every time an answer is correctly given a big smiling face fills a quarter of the screen. If the answer's wrong a frowning face appears and two more tries are allowed before the program gives the correct answer.

The program displays two numbers between one and five, chosen at random and a multiplication, addition or subtraction sign, also at random. They appear at five times normal size.

The answer must be followed by return and then a tick or cross appears along with the appropriate face.

At present the program is suitable for youngsters of five and a little older. You can increase the difficulty by changing the values of the variables a and b in line 30. Answers must not exceed 999.

The program block by block: line 10 jumps to instructions, 20-320 generate random numbers, arithmetic symbols and print them out, 330-830 handle numbers, arithmetic symbols and the graphics for the two faces, 840-920, sound effects and computation of value when answer is wrong, 930-1030, instructions.

Extensive use is made of graphics, making it a time-consuming job to convert my program for other micros.

```
10 GOSUB930:PRINT"■":POKE36879,27
20 A$="■■■
```

Micros are the new school books

Once upon a time there was a school which owned an encyclopaedia. It was very proud of its encyclopaedia as it was the only book in the school.

In fact it was the only school in the area with any books at all. Every parents day the teachers dusted the book down and showed it to all the parents, telling them what wonderful things could be done with it.

They told them how books, now printing was invented, would revolutionise office, and how — now information could be passed between one academic and another — new breakthroughs would be made in research.

They kept quite about the fact that, as there was only one book in a school of 300 pupils, the average child would be lucky to get more than a few hours a year in which to read it.

Anyway, most pupils did not read at all. Only a few clever ones were allowed anywhere near it to unravel its mysteries.

Does this sound familiar? Isn't this the situation now with computers in schools? Will schools ever achieve their aim of making their pupils computer literate with only one computer among so many?

Yet, surprisingly, advances are being made, though this may be partly due to so many parents now buying computers for their children. However, real advances will not be made until each school has at least one classroom of around 20 networked computers, or ideally one computer per child.

This is not a pipe dream. The microcomputer industry is growing fast and computer available now are at a price and specification undreamed of a few years ago.

Already the most recent machines being released are bearing a closer and closer resemblance to books in both price and looks.

The new Epson HX20 is portable and A4 size — the size of most magazines — and it is light and its price is less than half that of the Osborne.

The ZX Spectrum is, of course, smaller still and light to carry and at £125 is more comparable to the price of books.

How long will it be before someone brings out a portable version of the Spectrum? There are even rumours that Sinclair himself will be bringing one out this year.

If you agree that computers will soon become equivalent to the paper in books, where is the writing in the books going to come from? Advances in microelectronics have always been much faster than advances in software as software is so labour intensive and packages take many person-years to write.

This is where the problem, if any, might occur as 99 per cent of all educational software is eighter haute cuisine (small portions of exotic fare at inflated prices) or the result of the first year cookery class (they are practising on the customer; you may be lucky or you may get poisoned).

What we need is a McDonald's of software — professional but afforable.

If you discount so-called courses of only three programs, which are more equivalent to a chapter in a book or a lesson in a course, there are not many left.

In fact the only regularly advertised courses of computer programs of any significant size are a course in German from Wida Software and two maths courses from my own firm.

I wonder how many books will be left in schools by the end of the century.

Mrs Genevieve Ludinski, proprietor, LCL, 26 Avondale Avenue, Staines, Middlesex

Send your letters to Letters, Home Computing Weekly, 145 Charing Cross Road, London WC2H 0EE. Queries cannot be answered on this page

Small letters for my daughter

I recently purchased a BBC model B microcomputer and bought at the same time the Early Learning tape produced by the BBC Publications. I thought it might be suitable for my five year old daughter.

Of the five programs on the tape the only one that appeared to be aimed at her age group was the spelling one entitled Funny Man. And yet it proved unsuitable because children of that age group are taught to spell in lower case letters and not in capitals as the program uses.

I asked for help from the computer whizz kid son of a friend, but he was only able to alter the program so that it would accept words in small letters, but the mistakes were still printed in capitals.

I wonder if any of your readers have been able to crack this one and I would be grateful for any advice on how to alter the program.

The only other program I have got so far is one called Sweep, by Microcomputer Software. Once I had got over the embarrassment of complaining to the shop that when I loaded it the computer spat it out as a bad program, and been informed ever so politely by the shop assistant that the machine code program had to be entered as per the title, I found it to be very enjoyable and well worth the £7.99 I paid.

Dr P. C. Drennan, Weybridge, Surrey KT13 8DU

Helping the Dragon

The Dragon Independent Owners Association was launched on February 1 and we are confident it will serve a need among owners of the Dragon 32.

We intend to publish a monthly newsletter which will allow members to share tips and knowledge. We will also be offering discounted program tapes.

Doug Bourne and Dave Windle, organisers, School House, Nevern Road, Rayleigh, Essex SS5 6PY

Give me the facts

I am looking around for a computer to buy and I am willing to spend up the £300. I have looked at a lot of the advertisements and collected mounds of brochures.

But they all tell you how wonderful the machine is, without going into enough detail. I want to know things like how many sound channels it has got, the resolution of the screen and so on.

Surely it must be easy for the computer manufacturers to include these details? Unless the specification changes so often that they go out of date!

Chris Roberts, Wakefield, Yorkshire

New keyboard or new micro?

I'm getting fed up with my ZX81 because it takes so long to enter programs on the miniscule keyboard with those flat keys.

Friends have told me that there are several keyboards available which will fit my machine. Can any of your readers advise me on the ones which are best?

Or should I cut my losses and go out and buy a computer with a proper keyboard?

John Griffiths, Richmond, Surrey

Have you seen my micro ?

At least one of the American micro magazines runs a column where the numbers of stolen micros are displayed for the benefit of dealers.

If you should do the same perhaps you would start the ball rolling with my BBC model B. The number is 119843. It can be easily recognised as the cassette programs do not work.

Dr B. Ross 38 Wykeham Way, Burgess Hill, West Sussex, RH15 0HF

Let's get serious

Nearly every software advertisement I see is for games. Now I know people say that most people buy computers for games initially. But there must be some programs around for more serious use at home.

I would like to learn French, plan my household budget, keep a record of my friend's addresses and birthdays. Such a program could warn you several days in advance when you need to buy a present.

Come on, software firms, — let's get a bit more serious.

Ms Jane Evered, Streatham, London SW16

Flash Atari can turn upside down

More unexplored features of Atari computers. Philip Bramley shows how to use three of them with listings to type in

It's amazing what you can find tucked away in Atari computers if you look carefully.

Did you know that you can have flashing text? Or that it is quite easy to switch inverse messages on the screen back to normal, and even turn them upside down?

The secret is memory location number 755, whose official Atari name is CHACT. This stands for character control, and certainly gives you that.

Only the lowest three bits of CHACT are used. Bit 2 is for vertical reflect, Bit 1 for video invert, and Bit 0 for video blank. So the highest significant value that can be POKEd into the location is 7, when all three of these bits are high.

Any higher value that you try to use up to 255 will be accepted by the computer, but it will still only refer to the lowest three bits when reading it for its own information. This applies to many Atari locations, and explains many mysteries that appear in readers' letters.

For instance, if you enter GRAPHICS 1000, the machine ignores the higher bits that mean nothing to it:

GRAPHICS 1000 =
GRAPHICS 512+256+128+
64+32+8

Of these, only the 8 and the 32 are understood, so the computer interprets the instruction as GRAPHICS 8+32. Simple isn't it?

Anyway, back to our flashing text. The default value of CHACT is 2 (Bit 1 is high), and so any characters printed using the Atari key will appear as inverted (negative) versions of the standard ones. If you POKE 755, 0 then all of these characters will change to normal.

Now comes the interesting part. Bit 0 (The '1' bit) controls video blank so that any Atari key symbols disappear. They are still stored as information in the part of RAM user memory reserved for the screen data, but only the background colour is displayed.

So, if we POKE CHACT with alternate values of 1 and 0, all of these characters will flash off and on. A simple example is shown in Listing 1.

Bit 1 controls inverted video, and so characters can easily be made to change from normal to inverse. It is very useful to be able to flash between these two modes. Text can be highlighted, and error or warning messages made to stand out much more, especially if the screen colours and sound capabilities are used as well. Listing 2 illustrates one way of doing this.

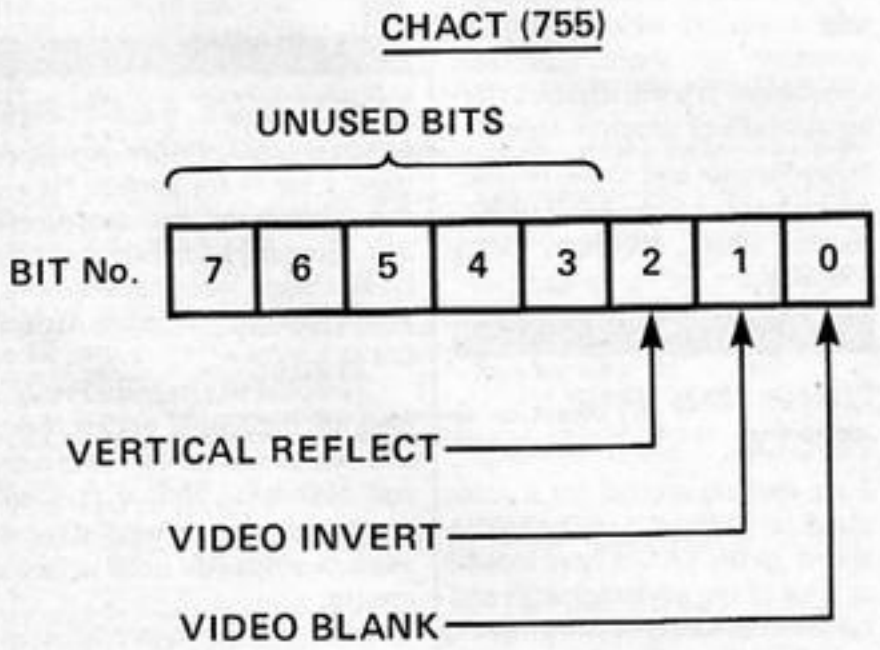
Atari owners may already know the other POKEs used. Line 110 switches off the cursor, and LINE 130 clears the location which stores the code for the last keyboard character pressed. LINE 210 then loops back to itself until the key is pressed.

Bit 2 is a bit more unusual, as it causes every character on the screen to turn upside down. Try a POKE 755,4. Once the novelty has worn off, you begin to wonder what possible use it could be.

Various things have been suggested. Card games could use upside down characters for the bottom of each card, with normal characters at the top. In games, reflections in mirrors and pools could be created by using the reflect bit on the bottom half of the screen.

This causes a slight problem, as CHACT applies to the whole screen, and since the computer redraws the whole screen image 50 times a second, we would normally have quite a job to change the value in CHACT at the right time every 1/50th of a second.

I say normally because Atari



Memory location 755 — called CHACT by Atari

Listing 1

```
100    GRAPHICS 0 : SETCOLOR 2,0,0
110    POKE 755,0
120    POSITION 7,5
130    ? "NORMAL TEXT AND GRAPHICS"
140    POSITION 6,8
150    ? "FLASHING TEXT AND GRAPHICS"
160    REM ENTER LINE 150 AS INVERSE CHARS.
170    FOR W = 1 TO 100 : NEXT W
180    POKE 755,1
190    FOR W = 1 TO 100 : NEXT W
200    POKE 755,0
210    GOTO 170
```

has designed into the computer a very powerful capability — the Display List Interrupt. It enables you to stop the computer part way through drawing the screen, insert a short machine code routine, and then carry on drawing the screen as if nothing had happened.

We can therefore instruct it to switch on the vertical reflect bit halfway down the screen. Then any characters on the top half of the screen will be normal, and any below the centre line will be reflected. Just what we need!

It is however, easier to demonstrate than to describe. Listing 3 is only a short program, but it contains a modified display list and a display list interrupt.

```
100    GRAPHICS 0 : SETCOLOR 2,2,2
110    POKE 752,1
120    POKE 755,0
130    POKE 764, 255
140    POSITION 9,5
150    ? "ZYLON FIGHTER CRAFT IN SECTOR"
160    POSITION 9,10
170    ? "STARBASE ON RED ALERT"
180    REM ENTER LINE 170 AS INVERSE CHARS.
190    POSITION 13,15
200    ? "PRESS ANY KEY"
210    IF PEEK (764) = 255 THEN 210
220    POKE 755,2 : SETCOLOR 4,2,2
230    SOUND 0, 25,2,8
240    FOR W = 1 TO 300 : NEXT W
250    POKE 755,0 : SETCOLOR 4,0,0
260    SOUND 0,50,2,8
270    FOR W = 1 TO 100 : NEXT W
280    GOTO 220
```

Listing 2

```
100    GRAPHICS 2 + 16
110    SETCOLOR 0,0,14
120    DLIST = PEEK (560) + 256 * PEEK (561)
130    POKE DLIST + 9,7 + 128
140    POKE DLIST + 10,6
150    FOR N = 0 TO 10
160    READ A : POKE 1536 + N,A
170    NEXT N
180    POKE 512,0 : POKE 513,6
190    POKE 54286,192
200    POSITION 3,4:?#6; "ATARI REFLECT"
210    POSITION 3,5:?#6; "atari reflect"
220    FOR N = Q TO 255 STEP 8
230    POKE 709,N
240    NEXT N
250    GOTO 220
260    DATA 72,169,4,141,10,212
270    DATA 141,1,212,104,64
```

Listing 3

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Try to bag the cash bags

Would you risk your life for money? You can with Marc Freebury's 3K program for the Acorn Atom

Grab the money and run — but watch out for the rain of arrows.

My program, for the Acorn Atom, means using the Z and X keys to move a little man from the left of the screen to collect money bags on the right.

They must then be taken to the far left where a random number of points is awarded for each.

It sounds easy... except for the little matter of up-arrow signs raining down on your man from the top of the screen which, if they hit him, will cause him to lose a life.

Fortunately, there are blocks of cover at three points, but the arrows erode these fairly quickly. Each time a bag is retrieved a random amount of cover is restored to one of the blocks.

If you score more than 5,000 you're given an entirely new set of cover. But this is very difficult to do so you are given the usual three lives.

Money runner, which uses 2K for the text and 1K for graphics, is written mainly in assembler and, to save space, REMarks are not used, BASIC keywords abbreviated and several statements are placed in single lines.

For these reasons it would be very difficult to convert to other machines, although you may like to use the ideas as a basis for your own programs, particularly for the BBC models.

As a guide, most keyboards are abbreviated like this: F. means FOR, G. means GOTO and GOS. means GOSUB. In fact, GOSUB may refer to a label, so G.a means go to a line whose first character is a.

Peek and Poke are replaced on the Atom by the more graceful ? operator. This means that ?X=Y represents the more usual POKE X,Y and X=?Y could be translated as X=PEEK(Y). There are also other combinations, like X?Y=Z means POKE X+Y,Z.

Random numbers are also a little odd — X=A.R.%Y+Z means X=INT(RND(1)*Y)+Z.

The numbers are sometimes prefaced with the hash (#) symbol which indicates a hexadecimal number. The code between the square brackets is a machine code routine to move all the arrows on the screen down one line.

The piece at the front checks the keyboard for a key being pressed. The screen begins at hex address 8000 and consists of 16 lines of 32 characters. The little man should be designed according to the character set of your own machine, if you aren't using an Atom.

```
  1000=5;Z=0;DIMRR10
  1100OSUB390
  1200P.$21;P=#80;[JSR#FE71;STY#8
9;RTS;]:P.$6
  1300LEAR0;?#E1=0;F.I=#8000TO#8
1FOS.4;!I=#20202020;N.
  1400F.B=1TO3;L=10;GOS.b;N.
  1500=0;T=1;M=0;C=0
  1600LI.RR7
  1700P.$30S"   PLAYER 1    TRIES
"T
  1800H=T/6
  1900X=#81C1;?#81FF=164;G=0
  2000?X=127;X?-32=48;X?1=28;X?-1
=28;X?31=47;X?33=28;WAIT
  2100FG=1;X?34=164
  2200FG=0;?#81FF=164
  2700LI.RR0;LI.#80;A=?#89;IFA<>5
6A.A<>58;G.300
  2400?X=32;X?-32=32;X?1=32;X?-1=
32;X?31=32;X?33=32
  2500X=X-(A=58)+(A=56);X=X+(X<#8
1C1)-(X>#81DE)
  2600FX=#81DE;G=1
  2700FX=#81C1;IFG=1;S=S+(A.R.%6
+1)*100;T=T+1;X?34=32
  2800FX=#81C1;IFG=1;IFS>5000;IF
C=0;C=1;F.B=1TO3;L=10;GOS.b;N.
  2900FX=#81C1;IFG=1;B=A.R.%3+1;
L=A.R.%6+1;GOS.b;G.170
  3000F.I=1TO H;?(#8021+A.R.%30)=
30;N.
  3101F?#95=0;F.I=#81E0TO#81FOS.
4;!I=#20202020;N.;G.200
  3200F.I=1TO20;!(X-1)=R.;!(X-33)
=R.;!(X+31)=R.;WAIT;WAIT;WAIT;N.
  3300LINK#FB7D
  3400!(X-1)=#20202020;!(X-33)=#2
0202020;!(X+31)=#20202020
  3500M=M+1;IFM=3;P."                 g
 a m e   o v e r"";LI.#FFE3;G.130

  3600T=1;G.160
  3700bF=#8045+(B-1)*10;F.J=F TO(
F+L*32)S.32;!J=-1;J?4=-1
  3800N.;R.
  3900P.$21;F.I=1TO2
  4000DIMP-1;[:RR0LDA@#DF;STA#90;
LDA@#81;STA#91;LDA@#FF;STA#92
  4100LDA@#81;STA#93;LDY@0;:RR1LD
A(#90),Y;CMP@30;BNERR2;LDA@32
  4200STA(#90),Y;LDA(#92),Y;CMP@2
55;BE0RR3;CMP@32;BE0RR4
  4300STA#96;LDA@1;STA#95;RTS
  4400:RR4LDA@30;STA(#92),Y;LDA@0
;BE0RR2;:RR3LDA@32;STA(#92),Y
  4500LDA@0;BE0RR2
  4600:RR2DEC#90;LDA#90;CMP@0;BNE
RR5;DEC#91;:RR5CMP@#20;BNERR6
  4700LDA#91;CMP@#80;BNERR6;LDA@0
;STA#95;RTS
  4800:RR6DEC#92;LDA#92;CMP@0;BNE
RR1;DEC#93;JMPRR1
  4900:RR7LDA@#20;STA#96;LDA@#80;
STA#97;LDY@0;:RR8LDA(#96),Y
  5000CMP@30;BNERR9;LDA@32;STA(#9
6),Y;:RR9INC#96;LDA#96;CMP@0
  5100BNERR8;INC#97;LDA#97;CMP#82
;BNERR8;RTS
  5200]
  5300N.;P.$6;R.
```

Play it again — my VIC-20 favourites

Recent releases and the not-so- new . . . Peter Richardson chooses the games he's most enjoyed on his VIC-20

Another Vic in the Wall £7

Bug-Byte, 98-100 The Albany, Old Hall Street, Liverpool L3 9EP.

For Another Vic in the Wall read Breakout — a computer games classic.

It seems quite simple on the surface but becomes compulsive, and you'll end up spending far longer playing than you intended.

Unlike most games, this one has absolutely minimal instructions. You are just told to type Load "A.V.I.T.W.", then Run. They must have assumed that the game is so well known that everyone knows how to play it. They were wrong. More instructions would be a distinct improvement.

Using paddles or the keyboard you have to bash your way through first a blue wall and then a yellow/green one.

As you progress your reactions must quicken to keep up, or you'll never get through the wall.

instructions	30%
playability	70%
graphics	60%
value for money	60%

★ ★ ★

Shark Attack £9.99

Romik Software, 24 Church Street, Slough, Berks SL1 1PT.

I made the mistake of thinking this game would be simple to master. I was wrong.

The pirates have thrown you into the shark infested sea and your only protection is a special atomic net with which to ensnare them. And there's the additional danger of octopuses... but sometimes the sharks will deal with them for you.

For every square of the screen you cover with your net — shown in yellow — you gain five points, with 200 if you can completely fill the screen.

Joystick or keyboard operation, using A for left, D for right, D1 for up and F7 for down. Using the joystick is best.

instructions	50%
playability	70%
graphics	60%
value for money	70%

★ ★ ★

VIC PANIC £7

Bug-Byte, 98-100 The Albany, Old Hall Street, Liverpool L3 9EP.

As one of the crew of an intergalactic mineral freighter, you have to carry out maintenance work on the superstructure using a network of ladders.

But during your work you make an unwelcome discovery... you are not alone. The ship is being taken over by aliens who will kill everyone unless someone stops them. And that someone is you.

Your only weapon is your space shovel. And the only way to destroy the aliens is to dig holes in the ship so they fall through, then fill the holes. You just hope the falls are fatal. Just when you think you've wiped them out still more aliens appear. Whatever you do, don't panic...

You start with 2,000 units of oxygen which is supplemented with every alien you destroy.

Scoring varies according to the colour of the aliens and the difficulty in destroying them. Cyan aliens score 100, red 200 and white 300. Red aliens have to fall through two levels and white ones only perish when they have plunged through three levels.

Choice of keyboard or joystick operation. Use a joystick if you have one.

instructions	75%
playability	80%
graphics	70%
value for money	75%

★ ★ ★ ★

Nightcrawler £9.99

Rabbit Software, 380 Station Road, Harrow, Middlesex HA1 2DE.

A fast-action version of Centipede... and I mean really fast.

You are in the Green Forest where lurk strange and formidable creatures. Your job is to destroy the Nightcrawler by chopping it up into small pieces.

It seems simple, until you find there are no less than 39 different levels. So to progress to the level of master — if you ever do — takes a lot of practice with keyboard or joystick. And while you are trying to kill the Nightcrawler a Pacman-type figure appears on the screen trying to do the same.

For a game where your reactions must be lightning fast, this has few equals.

It's quite easy to score at the lowest level. But to reach the highest level was beyond me, although I tried for hours. Still, it's a challenge worth taking up.

instructions	80%
playability	80%
graphics	80%
value for money	70%

★ ★ ★ ★

VIC Gammon £7

Bug-Byte, 98-100, The Albany, Old Hall Street, Liverpool L3 9EP.

A computer version of backgammon and very like the real thing. A clear and concise double-sided instruction leaflet is better than the poor guidance provided with some other games.

You play against the computer — you use the black counters and the VIC plays with the white ones — and the player with the highest dice score starts.

The winner is the one who bears off all the counters first. So if you end while the computer has a counter on your side of the board you score three points.

If, as most people do, you play a series, award one point per match. Compulsive to play, VIC Gammon will keep you engrossed for a long time, even if you've never before played the board game.

instructions	75%
playability	75%
graphics	80%
value for money	85%

★★★★

Mastermind £9.99 plus £1.99 per subject

Commodore, 675 Ajax Avenue, Slough Trading Estate, Slough, Berks.

Based on the TV series, up to four players can take part. You are asked for their names and occupations and there are two sections, one for general knowledge and one for specialist subjects.

The game runs on a VIC with 8K or 16K memory expansion and specialist subject cassettes cost £1.99.

The package comes complete with two cassettes — the operating system and general knowledge questions — plus excellent instructions showing screen pictures.

Questions on sport and games, wine and food, music, films and television, science and technology are already on the general knowledge tape. Scores are calculated in exactly the same way as the real thing.

An all-round winner.

instructions	90%
playability	80%
graphics	—
value for money	80%

★★★★

Siege £6.99

Postern, PO Box 2, Andovers Ford, Cheltenham, Gloucs.

Your task is to defend your castle against the evil marauders who are climbing the walls. To stop them you must hurl rocks. But naturally they get annoyed at this and start to move even faster.

Stop them reaching the top of the wall at all costs or you've lost.

There's a choice of joystick or keyboard operation. But using the keyboard is just too fiddly when you must move fast. I was only happy when using the joystick.

Siege is a good example of not always choosing higher-priced and better advertised games. At £6.66 this game is very good value from one of the lesser-known software houses.

If Space Invaders becomes a little too predictable, try Siege instead.

instructions	70%
playability	70%
graphics	70%
value for money	80%

★★★★

Kosmic Kamikase £7.99

Audiogenic, PO Box 88, Reading, Berks.

Some people never tire of Space Invaders, but it's nice to try a variation. This one has two on the same tape, for 3K or 8K memory expansion.

The packaging is deceptive, showing a jet fighter attacking an aircraft carrier and a close-up of a World War Two Japanese pilot. It remains another version of Space Invaders.

It seems slow compared with other games of this type. You have to shoot suicidal aliens for one point each and their mother ship, which scores five. You start with one battle station of your own and, unlike other versions, you are awarded another for every 25 points.

Cursor keys are used for left and right movement and the spacebar for firing. A joystick can be used for more flexibility.

For all Space Invaders addicts who are looking for a little extra, without spoiling the fun.

instructions	50%
playability	60%
graphics	60%
value for money	50%

★★★

★ poor ★★ average ★★★ good

★★★★ very good

★★★★★ excellent

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Let me first of all tell you a little about myself: I am 52 years of age and I am placing this advertisement at a time that is near to my contemplated retirement. I wish retirement in order that I can find time to commence writing my second book, more of this later.

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Let me tell you—it is not so very long ago that I was BROKE, yes completely and utterly BROKE. The Bank Manager would not even see me for a loan, let alone grant me one, and I was paying off my debts by small instalments to avoid Court Action for Recovery or even Bankruptcy.

We were renting a very small, very old house (since demolished) paying at that time 10/- weekly rent—this sum we had to literally 'scrape' together each week.

We did have (I say **did** have) an old 'banger' of a car, for which I had originally paid £140 on Hire Purchase.

One day along came the Hire Purchase Company Representative to repossess the car—as I then owed them two monthly rentals of £9 each (that was the amount of the monthly rental)—so that was the end of the car and the money paid on it—all lost.

I knew then that I had to do something about this terrible state of affairs—**I KNEW I COULD DO IT**.

I had been 'working on' an idea that I had held **SECRET** for many, many years.

Remember—**I WAS BROKE**—in fact, somehow I managed to save the sum of TWO POUNDS (£2) assisted by my wife who had such great faith in me, however just this two pounds to commence—I have never looked back since and I have come a very, very long way, believe me.

I NOW HAVE THREE CARS.

I HAVE A LUXURY HOME and builders have recently completed an extension for me, quite costly of course, it is worth a SIX FIGURE SUM (£100,000) to me now, or if you prefer American Dollars, about $189,000.

My wife, our daughter and myself live very, very comfortably—TO SAY THE LEAST, surely this you now realise.

To give you just two recent examples of my **weekly** payments into my bank account, WORKING PART TIME ONLY REMEMBER—

They were £3,649—THREE THOUSAND, SIX HUNDRED AND FORTY-NINE POUNDS, or if you prefer it in American Dollars, about $6,896.

The second one for £1,836—ONE THOUSAND, EIGHT HUNDRED AND THIRTY-SIX POUNDS, again if you prefer it in American Dollars, about $3,470.

Proofed this paper.

Remember, THESE ARE JUST TWO RECENT WEEKS AS EXAMPLES FOR YOU, working only PART TIME, now are you interested?

This advertisement has been written for YOU—YOU can decide which is best for you—to be broke or to HAVE MONEY—YOU DECIDE, you have my MONEY REFUND INCLUDED of course.

There are ONLY TWO KINDS OF PEOPLE IN THIS WORLD—Those who say it can't be done—**AND THOSE WHO DO IT**—like Myself and now, very shortly YOU.

The book I sell is NOT a book of ideas, whereby you have to 'sort out' and secure your own eventual business ideas—It is NOTHING LIKE THAT—it details ONE BUSINESS ONLY at which I've succeeded and at which you will now succeed—it trains you for this ONE BUSINESS ONLY, there is NOTHING ELSE.

I knew what I wanted, when I was down and out—at that time NO ONE WAS INTERESTED IN MY PROBLEMS, this is natural of course—do you know what you want? If it is the ROAD TO RICHES and you SINCERELY wish it, this is for you.

Protect your future and your self respect, whilst at the same time protecting your Family in the future—START MAKING SOME REAL MONEY FOR YOURSELF and STOP DREAMING about it. I've known absolute poverty, been right down, on the floor, it is not very nice—but I DID NOT INTEND TO REMAIN THERE—compare that position with what I have today—apart from my income—THREE CARS—LUXURY HOME—and, Oh Dear so much more than words can ever tell you.

I made all the mistakes, discovered all the pitfalls along the way—**and I paid for them**—none of these will befall you, as you have MY BOOK to guide you and to train you.

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Within THREE WEEKS of my commencing on my own, in this business, I can tell you—

I HAD PAID OFF ALMOST ALL OF MY DEBTS AND BOUGHT A CAR, yes within the first THREE WEEKS.

YOU can decide how big you wish to become, it was my intention never to get too large, so I simply 'cut down' and worked only part time, enjoying life to the full and the rest of the time doing whatever I WISHED TO DO, no matter what it was—Fantastic—yes, BUT TRUE.

I make my offer at this time, to enable me to secure more time to write my second book, it will take me at least 12-18 months, but when it is published it will prove to be a sensation, believe me.

It is my intention to pass on the SECRET OF MAKING MONEY to YOU, I KNOW you are already very anxious to learn about it. Even if you are at present employed, you will commence part time, you will soon be presenting your notice to your present employer—TO WORK FOR YOURSELF—remember my own first three weeks—I EVEN BOUGHT A CAR.

Why 'line the pockets' of your employer any longer, start 'lining your own' before you leave it too late. I am not making this offer to MAKE YOU RICH, in order to make myself rich, it is not necessary, you already know why. Working part time, my last financial year shows income well in excess of £70,000 with profits at over £11,000—yes JUST PART TIME, this can be multiplied many times if necessary. For those who wish it, in American Dollars again, this amounts to about $132,300 and profits about $20,790.

I mentioned already that "More than half of the people in the World are Asleep", this is what allows the rest of us (Me and You) to MAKE THE REAL MONEY—because you are about to become one of the AWAKE people—if you WISH TO GROW RICH.

The pessimists say—"It is not possible to succeed on your own any more"—what utter rubbish and absolute nonsense—these people belong to the category that are ASLEEP—believe me, it is easier now than ever it was, but only those who WANT TO MAKE MONEY do so, I KNOW.

I was talking to a Rolls-Royce Owner recently, who said, 'the roads are paved with gold—people just will not help themselves'—it is TRUE you know, it is there for you to help yourself. Just taking, as a small example for you my most recent four years of part time working—on each of those years my income has increased each year over the preceding one—whilst others around me have closed down and gone into Bankruptcy.

Just examine again some of the cash figures I have given you herein, this is only a part, I'm not disclosing everything to you of course, just sufficient to give you an idea of what YOU can now do in my line of business. I started with a capital of just TWO POUNDS.

This offer is made under my MONEY REFUND, it is your GOLDEN OPPORTUNITY OF A LIFETIME TO MAKE MONEY, it is YOUR SUCCESS that matters to me, hence this REFUND OFFER.

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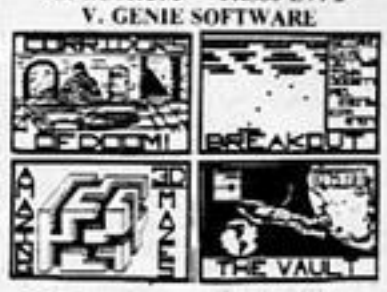

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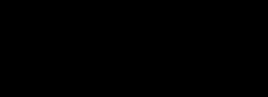

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